VOL. XVII, No. 24 CHICAGO, JUNE 16, 1910 $3.00 PER YEAR

MOTOR AGE

Glidden Tour On Its Way Into Dixie

LOUISVILLE, Ky., June 14—Special telegram—Thirty-eight cars started out of Cincinnati this morning, constituting as they did the sum total of the 1910 national tour for the Glidden and Chicago trophies. Of this number twenty-six were contesting and twelve were running as official, press and non-contesting cars. There are fourteen struggling for the coveted Glidden cup and twelve contending for the handsome bronze plaque donated by the Chicago Motor Club. As on every previous national tour, the penalties the opening day have been heavy, four losing their perfect standing in the Glidden and four meeting the same fate in the Chicago trophy ranks.

The four to lose in the Glidden were No. 4 Chalmers, driven by Matson, which lost by losing a pin out of the emergency-brake rod; No. 6, Cole, 30 points for having to twice clean out the gasoline line to the carbureter; No. 9, Parry, for having to take on gasoline after leaving Lexington, and No. 14, Ohio, 54 points made up by taking a gasoline outside of a control, repairing water pump and retiming magneto.

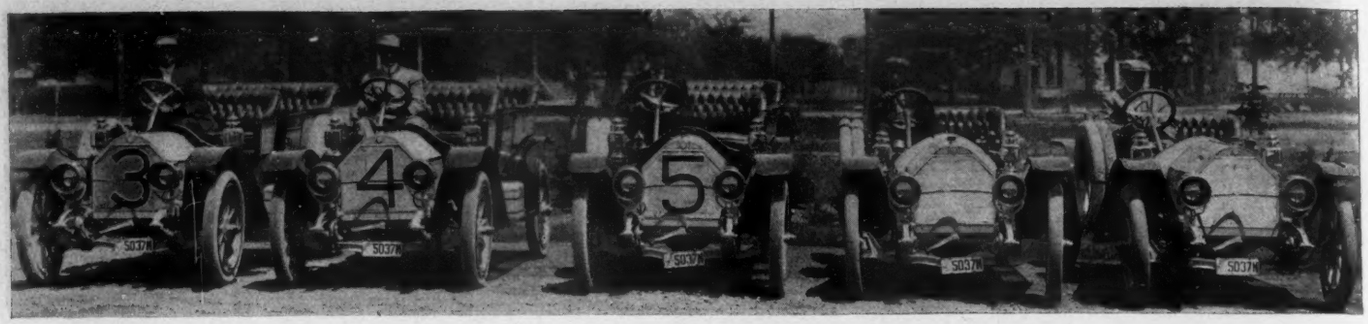
Those to lose out in the Chicago trophy ranks were: No. 104, Cole, which in trying to pass between a Moline car and an approaching horse-drawn vehicle collided with the horse vehicle and broke a wheel, receiving all told the heavy penalty of 1,042 points for work in replacing the wheel with a new one from near Louisville. In spite of the time lost thereby the car was able to check in on time. No. 106, Falcar, lost 60 points by having to put on a new magneto. A collar on the original one slipped, putting the timing out and necessitating the replacement. No. 110, Lexington, lost 4 points by losing a pin in the break rod and having to use a new one, and No. 111, Westcott, lost 6 points for having to twice adjust the carbureter.

This completes the dark side of the first day's story, and along a lighter and more pleasant vein it will suffice to state that the perfect score cars, eighteen in all, made remarkably clean scores and were in nearly every case away ahead of schedule. Ray MacNamara in No. 1, Premier six, was the first man out of Cincinnati and was first into Louisville, having caught the pacemaker when 12 miles from the night stop. The other Premier, namely, No. 2, was in the perfect ranks, as were two of the three Chalmer cars, Maxwell, Cartercar, Glide, hotb Ohios and the Cino in the Glidden field. In the Chicago trophy the three Molines all arrived and checked in with clean sheets, as did the Lexington, Parry, Maxwell and two Cartercars.

Eight cars out of twenty-six contestants should not have dropped out on today's run of 163 miles, with the exception of 25 miles, the roads were good but treacherous. There was one stretch of 15 miles, 50 miles out of Cincinnati, that gave trouble because of the water breakers and the big stones that jut out of the

THE CHICAGO TROPHY
PRESENTED by the CHICAGO MOTOR CLUB
WINNER OF THE ROADSTER DIVISION OF THE 1910 AMERICAN AUTOMOBILE ASSOCIATION TOUR FROM CINCINNATI TO CHICAGO VIA DALLAS, TEX.

GLIDDEN TROPHY AND CHICAGO MOTOR CLUB PLAQUE

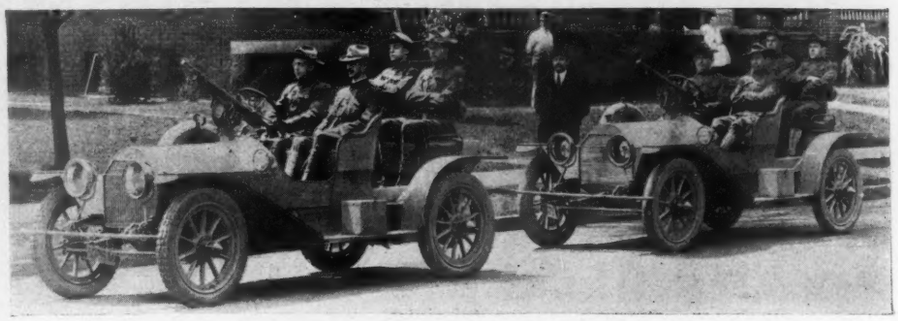


THE CHALMERS BRIGADE—THREE IN THE GLIDDEN AND TWO OFFICIALS' CARS

TUESDAY, JUNE 14	
Perfect scores, Glidden	10
Penalized today	4
Perfect scores, Chicago	8
Penalized today	4

surface of the road. There were a few other stretches where going was rough, but not of the nature to put cars out in such numbers.

Lexington is 84 miles out of Cincinnati and 20 miles before reaching Lexington and until Frankfort was reached, 27 miles past Lexington, it is questionable if a Glidden tour ever has passed over such perfect roads. The macadam surface is wide enough for three touring cars to travel abreast, and for miles the roadway is oiled and is in as perfect condition as the best park drive of our leading cities. The road is practically straight, leading up and down long rises nearly a mile in extent. The country on either side is well farmed and well wooded and homes are inviting. For 50 miles out of Cincinnati the country does not evidence that prosperity, which is everywhere apparent in the Lexington vicinity and which is perhaps equally if not more apparent as Louisville was approached, where the roads were nearly the equal of those around Lexington. Whoever desires a tour from Cincinnati to Louisville over today's route can feel that it is within easy reach, even if his car is not the highest powered one. The roads are stone every foot of the way, and the going would be nicer after a rain.



MILITARY CADETS IN NON-CONTESTING CADILLACS

TWO MAXWELLS, ONE IN EACH DIVISION

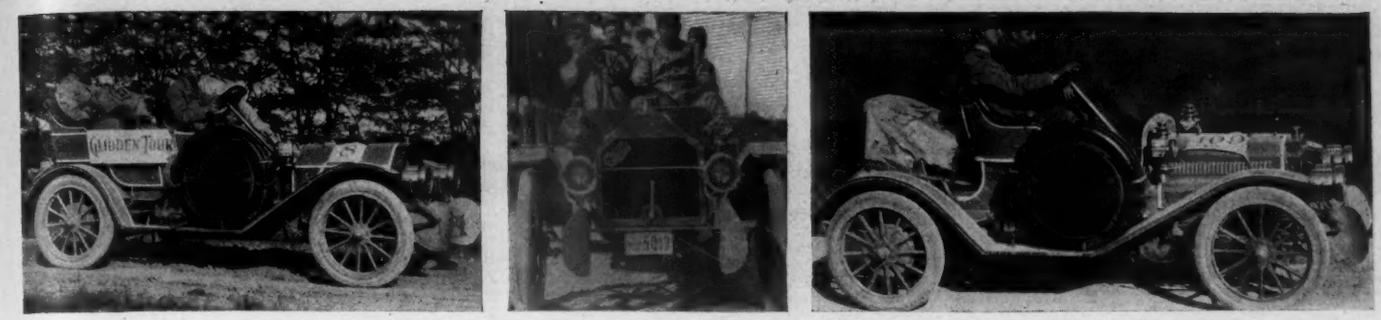
VAN SICKLEN IN FALCAR

Today has marked a new epoch in Glidden tour history in that it is the first day a Glidden tour has penetrated the south—that is, on the equator side of the Mason and Dixon line. The tour started in Ohio, but continued for but a few minutes until the Ohio river was crossed into the town of Covington on the Kentucky side.

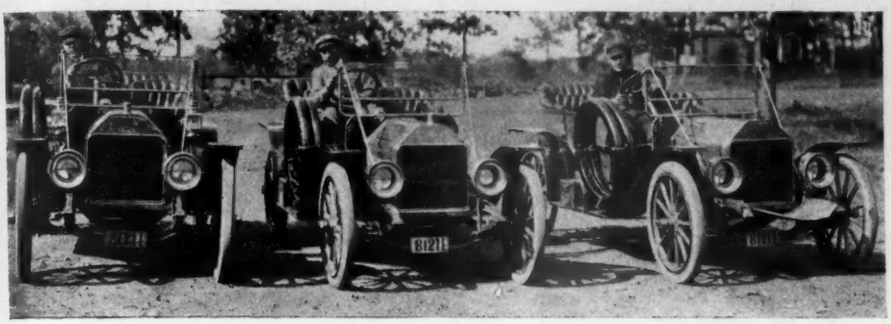
All day evidences of southern life were shown at every turn. In the Blue Grass country, which was just touched at Lexington, the tourists had a glimpse of the big stock farms with their whitewashed fences, colonial types of homes with broad shaded lawns and the entire farm population seated thereon to watch the cars go by. Everywhere the negro element was apparent, but in a subdued role as compared with conditions in northern states. If it were not for the presence of the latter, as well as the peculiar southern types seen, it would be difficult for the tourist to have imagined he was in a southern state. The roads were as those of a leading New England state and the piles of stones alongside, with an occasional man breaking them with the hammer, told how carefully they were looked after. Today has not been a day in a land in which motor cars are not known—in fact, there scarcely was seen a horse that showed the slightest fear and big cars were met every mile or so. It was surprising to see the numbers of cars selling at over $3,000 that were met today.

With not an exception the enthusiasm was general and spontaneous from start to finish. Every roadside corner had its crowd, families were picnicking under shade trees near the road, villages were in holiday mood and in Lexington, Frankfort, Georgetown and Shelbyville the streets were packed with people.

The twelve cars not contesting for either



CARTERCARS ARE ENJERED IN BOTH SECTIONS OF THE BIG TOUR



THE DREADNAUGHTS—THE THREE MOLINES

the Glidden or Chicago trophies are as follows: Two Chalmers used for strewing the confetti; a Columbia, the pacemaker; two Cadillac cars equipped with rapid-fire guns and entered by the Northwestern Military Academy of Highland Park, Ill.; five press cars, consisting of one Halladay, two Cuttings, one Great Western and one Westcott. Lastly comes No. 75, Rapid truck, which is serving as a baggage wagon and has made today's run in good schedule. The Halladay press car left Cincinnati after the regular contestants had checked out and trailed the contestants into Louisville. The two Cadillac cars, with their automatic guns mounted on the dash, made an imposing sight and attracted immense interest at every point.

With a couple of exceptions, all of the cars contesting in the Glidden and Chicago trophy classes are 1910 models and of the same type as seen on the streets of different cities every day. The three Moline entries in the Chicago trophy class are 1911 models and differ from the 1910 lines by the use of longer strokes than formerly, the cylinder sizes being 4-inch bore and 6-inch stroke. These cars are also built with dropped frames.

There are only two six-cylinder cars in the contest, a Premier and a Pennsylvania, both Glidden contenders. All of the cars in the Chicago trophy class are four-cylinder types, excepting a two-cylinder Cartercar, this being the first time that a friction-driven car has competed for Glidden honors.

As might be expected, this is a magneto season and every car excepting the two-cylinder Cartercar is fitted with one form or another of magneto. Of the twenty-six contesting cars Bosch magnetos are fitted on nine cars, Splitdorf magnetos on eleven, Remy on two, Eisemann on one, Kurtz on two, and one car is without.

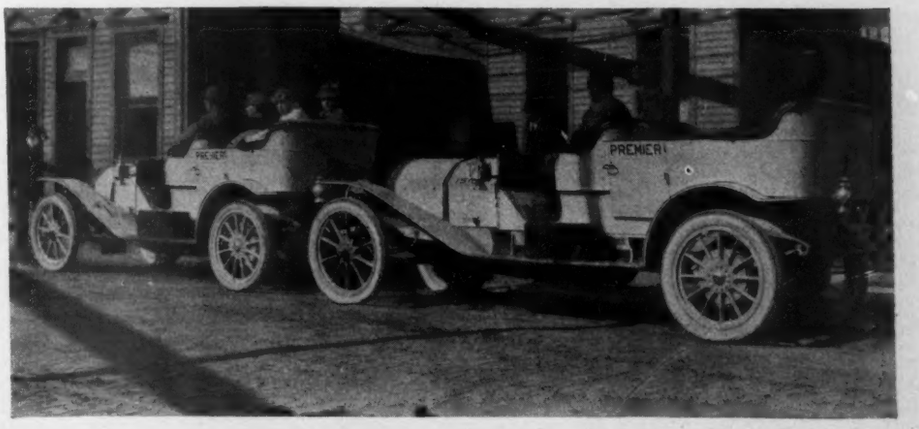
In the carbureter field the Schebler leads with sixteen out of the twenty-six, the Mayer is used on the three Chalmers cars, the Maxwell type is used on the Maxwell machines. Besides two Strombergs, there are employed one Miller and one Brush.

From a strictly touring point of view, the employment of mud aprons in front of the radiators is one of the big features. In the Cartercars these are permanent-like metallic devises with a hinged door to permit of cranking the motor. The Premier cars use heavy leather flaps and others use the conventional leather or canvas apron stretching between the side members of the frame in front of the radiator

Tough Going Second Day

Nashville, Tenn., June 15—Special telegram—Starter Ferguson failed to answer roll call tonight at the end of the second day of the tour and in consequence there was no official statement made tonight as to the penalizations of the day. It was given out late this evening, after Chairman Butler had waited until bedtime for Ferguson, that the daily report would not be made until tomorrow. However, it is certain there are still many perfect scores left. The two Premiers and the three Molines reported informally that they had survived the day, while the Falcar, which was penalized yesterday, checked in with a clean score for today. All three Chalmers made the trip from Louisville to Nash-

LEXINGTONS IN CHICAGO TROPHY SECTION



PREMIERS 1 AND 2 IN GLIDDEN

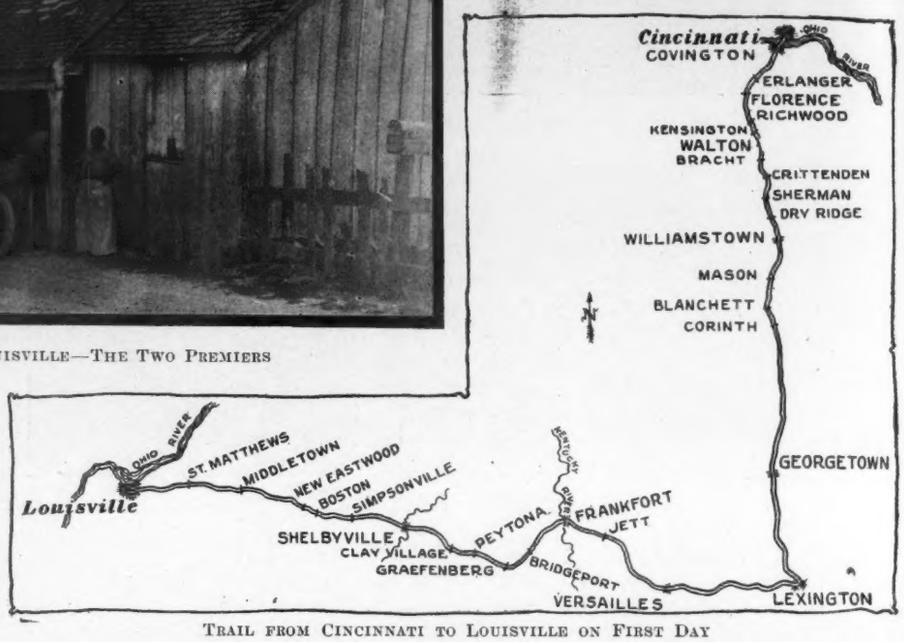
BETWEEN CINCINNATI AND LOUISVILLE—THE TWO PREMIERS

ville without trouble, although Matson is bemoaning the demerits he drew yesterday running from Cincinnati.

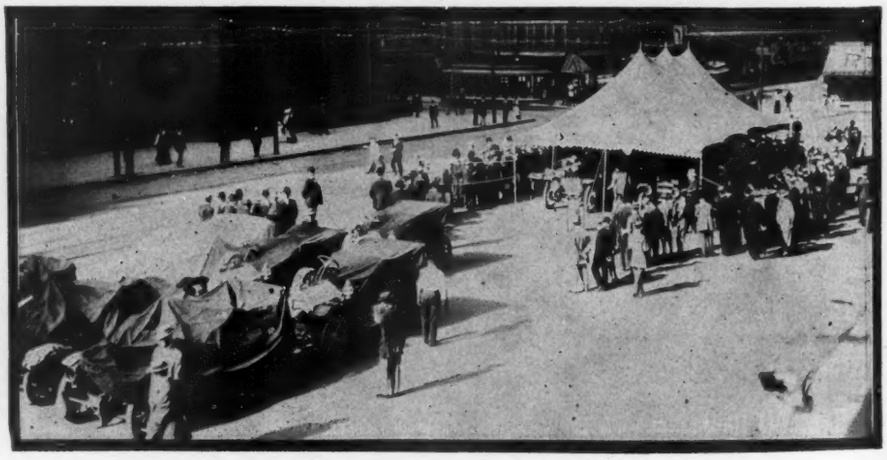
Rough Roads Encountered

Bowling Green, Ky., June 15—Special telegram—At this point, 130 miles in the run from Louisville to Nashville, it looks as if many of the eighteen perfect scores that remained at the end of yesterday's run may be eliminated. This is due directly to the terrible condition of roads between Louisville and to within 20 miles of Bowling Green. If yesterday the tourists were treated to some of the best roads a national tour ever passed over, today has given some of the worst. The route to here, the noon control, has been over an old worn-out macadam road that was built, the natives say, 150 years ago. In places the stones that one time formed the bed of the road, stand 6 inches out from the ground, and the cars had to drop to 5 miles an hour. Stretches of this nature nearly ½ mile long each were encountered more than a dozen times, and often the road was flooded with water in places for over 100 yards at a time. The bottom, however, was stone, so that the water did not offer any difficulties.

In spite of these road conditions several of the cars checked in ahead of time. The big cars were running on a 20-mile-an-hour schedule and the smaller ones at an 18-mile rate. The schedule for the big ones was 6 hours and 30 minutes, and for the smaller ones 7 hours 13 minutes. In spite of this Ray McNamara, in the Premier, checked in here well ahead of time, and was carrying the pacemaker's flags, the Columbia having had to surrender the coveted bunting at Cave City because of a continuation of tire troubles, the driver having put in eight new inner tubes which he had borrowed from different contestants along the road. The Columbia was not the only car to suffer with tire difficulties up to this point. The



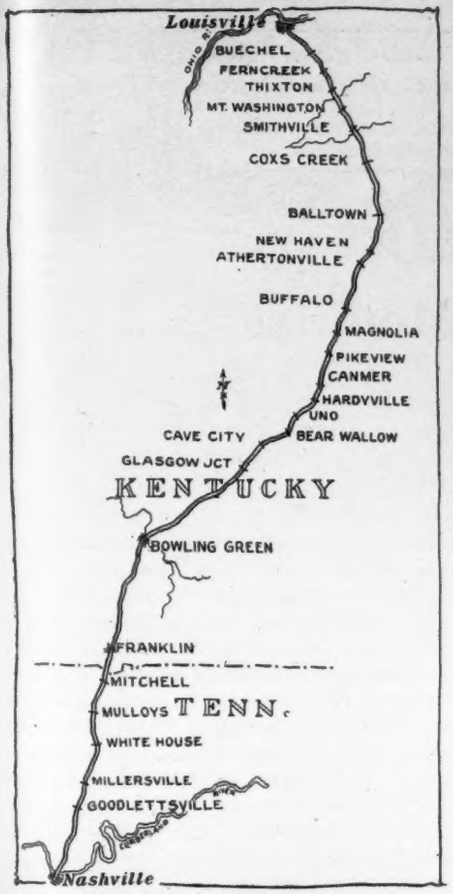
TRAIL FROM CINCINNATI TO LOUISVILLE ON FIRST DAY



WHERE THE TECHNICAL COMMITTEE WORKED AT CINCINNATI

TABLE SHOWING EQUIPMENT AND PENALIZATIONS OF THE GLIDDEN TROPHY CARS

No.	Car	Driver	No. Cyl.	Bore	Stroke	Carbureter	Speedometer	Shock Absorber	Tires	Magneto	1st day	2d day	Total to date
1	Premier	McNamara	6	4½	5¼	Stromberg	Jones&Stewart	None	Goodrich	Bosch	0		
2	Premier	Ballinger	4	4½	5¼	Schebler	Jones&Stewart	None	Diamond	Bosch	0		
3	Chalmers	Gardham	4	4	4½	Mayer	Warner	Weston	Goodrich	Bosch	0		
4	Chalmers	Matson	4	4	4½	Mayer	Warner	Weston	Goodrich	Bosch	2		
5	Chalmers	Bolger	4	4	4½	Mayer	Warner	Weston	Goodrich	Bosch	0		
6	Cole	Knight	4	4	4	Schebler	Stewart	None	Diamond	Splitdorf	30		
7	Maxwell	Wells	4	4¼	4¼	Maxwell	Jones	Hartford	Ajax	Splitdorf	0		
8	Cartercar	Mahoney	4	4¼	4½	Schebler	Stewart	None	Goodyear	Splitdorf	0		
9	Parry	Dull	4	4¼	4½	Schebler	Warner	Hartford	Diamond	Kurtz	3		
10	Glide	Castle	4	4¾	5	Schebler	Stewart	Hartford	Diamond	Eisemann	0		
11	Ohio	Stockhard	4	4¼	4¾	Schebler	Stewart	None	Goodrich	Splitdorf	0		
12	Ohio	Hillock	4	4¼	4¾	Schebler	Stewart	None	Goodrich	Splitdorf	0		
14	Pennsylvania	O'Donnell	6	4¾	5¼	Miller	Warner	None	Jelco	Bosch	54		
15	Cino	Donnelly	4	4⅞	5	Stromberg	Warner	None	Diamond	Remy	0		



THE RUN THE SECOND DAY

RAPID TRUCK WHICH IS CARRYING THE TOURISTS' LUGGAGE

Halladay press car had a couple of punctures; the No. 2 Premier had a couple of cases of tire difficulties, and several of the others, including the Cadillac military cars carrying the rapid-fire guns.

Up to 4 o'clock all cars had reported through here, excepting the Cole runabout and the two-clyinder Cartercar, both contestants in the Chicago trophy class. No reports from either have been received, except that the Cartercar was seen changing tires near Cave City. Among the leaders to check in at this point were the Cino, both Lexingtons, all three Chalmers, the Westcott and the Glide. The Falcar, driven by Van Sicklen, was one of the early arrivals and reported in good running shape.

From observations along the road one or two lost their perfect scores today by having to add water before reaching the 100-mile limit, the rule governing water, gasoline and oil being that none can be taken on without penalty until the car has made 100 miles.

Today's run has had a historical aspect in that the route led through the Abraham Lincoln land, the tourists at one point getting a glimpse of what is reported to be the old school at which Lincoln received some of his early education. The building is now used as a hen-coop. When passing Cave City the tourists were within 9 miles of Mammath Cave.

For miles today the most sinuous course was encountered. The road followed a narrow valley rising to the top of the hills every 5 miles and dropping to the stream level in the succeeding 5. While making these ascents and descents the roads abound in horseshoe twists that are so short that speed must be cut to 5 or 6 miles an hour. Several of the hills were miniature Simmering hill-climbs. At points cars going in opposite directions would be close enough to these curves to throw a ball from one to another car ½ mile ahead. There was not one or two but a dozen or more of these twists. These played their little part in slowing the cars.

PREMIER NO. 2 MAKES FAST TIME OVER KENTUCKY ROADS

TABLE SHOWING EQUIPMENT AND PENALIZATIONS OF CHICAGO TROPHY CARS

No.	Car	Driver	No. Cyl.	Bore	Stroke	Carbureter	Speedometer	Shock Absorber	Tires	Magneto	1st day	2d day	Total to date
100	Moline	Van Dervoort	4	4	6	Schebler	Warner	None	Goodrich	Splitdorf	0	....	.....
101	Moline	Wicke	4	4	6	Schebler	Warner	None	Goodrich	Splitdorf	0	....	.....
102	Moline	Salisbury	4	4	6	Schebler	Warner	None	Goodrich	Splitdorf	0	....	.....
103	Lexington	Moore	4	4¾	5	Schebler	Warner	Hartford	Goodrich	Bosch	0	....	.....
104	Cole	Martin	4	4	4	Schebler	Warner	None	Diamond	Splitdorf	1042	....	.....
105	Parry	Neff	4	4¼	4½	Schebler	Warner	None	Diamond	Kurtz	0	....	.....
106	Falcar	Van Sicklen	4	4⅛	5¼	Excelsior	Stewart	Hartford	Diamond	Bosch	60	....	.....
107	Maxwell	Illingsworth	4	4¼	4¼	Maxwell	Jones	Hartford	Ajax	Splitdorf	0	....	.....
108	Cartercar	Landsheft	4	4	4	Brush	Stewart	None	Goodrich	Splitdorf	0	....	.....
109	Cartercar	Pendleton	2	5½	4½	Schebler	Stewart	None	Goodyear	None	0	....	.....
110	Lexington	Hays	4	4¾	5	Schebler	Warner	Hartford	Goodrich	Bosch	4	....	.....
111	Westcott	Bevington	4	4⅛	5	Schebler	Stewart	None	Diamond	Remy	6	....	.....

Published Weekly
The CLASS JOURNAL COMPANY
1200 Michigan Avenue
CHICAGO
New York Office, 239 West 39th Street

MOTOR AGE

Subscription Rates
United States and Mexico, per year, $3.00
Other countries including Canada, $5.00

Entered as Second-Class Matter September 19, 1899 at the Postoffice at Chicago, Illinois, under Act of March 3, 1879

The Farmer Now Is the Motorist

TO espouse the cause of good roads is popular because good roads benefit everybody. Motor clubs that put forth their efforts for the building and maintenance of roads will strike a popular chord and should and will receive the support of the general public. Time was, not so many years ago, when the motorist dared not advocate good roads; in fact, he hardly dared advocate anything, for whatever he was for the rest of the people were against. The motorist was an Ishmael. Every man's hand was against him, and the impression was that he returned the compliment in like measure. The farmer was his worst enemy, for as he pursued his troubled way through the country he scared the farmer's horses, frightened his children and killed his chickens, spreading ruin and desolation in his path, according to the heated idea of the wrathful farmer. Those were the days of "the farmer AGAINST the motorist."

TIME passed, motorists multiplied, horses ceased to scare, and one day a farmer's son came home and brought a motor car with him. The farmer rode and found that a motor car was a pretty nice thing to have around. Then he gradually learned that motorists are human beings, and from being against them he learned that they were battling for a common cause—good roads—and it became the "farmer AND the motorist." The forces so widely divergent at first were united. Time passed quickly, crops were abundant, granaries were filled to bursting, and the farmer, with money to spend, began to buy motor cars. The infection spread rapidly, and today the situation is again changed so that now it is "the farmer IS the motorist."

ALL this change has taken place in less than 10 years. The utility of the motor car has been demonstrated so conclusively that there now is no necessity for argument; everybody knows that the motor car is the logical commercial and pleasure vehicle of the present day. The next decade may find the motor car supplanted by flying machines, for pleasure riding at least, and the words "aeroplane, biplane, aerodrome" will come as trippingly from the tongue as we now speak of two-cylinder and four-cylinder motors, garages, and like strictly motoring terms with which the general public is familiar at the present time.

THE men who risked their lives and spent fortunes in the development of the motor car have taken up the flying machine with the same enthusiasm that upheld them when they deserted the bicycle for the motor car. They have proved the practicability of the motor car, and now, with the rich experience thus gained they have undertaken the task of proving the practicability of the flying machine. In the old days we were wont to say that the list of officers of a motor club read like the list of the older bicycle club days. Today the list of officers of the aero clubs are but a repetition of the early motor car club roster of officers. It is the same class of hardy pioneers. But we will leave it to these men to develop the flying machine. We are more directly concerned just now in the motor car and its correlary, good roads. The use of the motor car—the farmer's vehicle of the future—is dependent on good roads, and the work accomplished by the motor car owner in the past few years has demonstrated that good roads are largely dependent upon motor cars for their present state of advancement and their future development.

THE farmers should rally to the support and assistance of motor clubs, for the farmer of today has lost all the oldtime prejudice against cars. If he does not now own one he knows that he will in a short time. It is the logical, economical business and pleasure vehicle for him.

THE American Automobile Association, with its quarter of a million members, is the great power now working for federal aid in building roads. The transcontinental highways which will be built within the next few years may be directly attributed to the work of this force at the national capital. The larger this organization becomes the sooner will its objects be attained. There is nothing incongruous in a farmer belonging to the American Automobile Association. His duty is to affiliate with the organization. It is the prime mover in the good roads cause, and no farmer will dispute that good roads are of benefit to him. The motor club offers the farmer an opportunity to become a member of the American Automobile Association, and thus aid in its work. The club becomes a member of the state association, and this in turn becomes a part of the national body. This offers the quickest and most efficient method of reaching the good roads problem.

NO truer words ever were uttered than when Mayor Gaynor of New York city told the Atlanta-New York tourists: "Good roads between the north and south mean a great deal. No roads mean barbarism, but where you find the finest roads you find the finest civilization. Indeed, it is said that all one needs to know concerning a new country, to ascertain its condition, is found in the condition of its roads and its lower court of law." This in itself is a lengthy epigram well worth preserving and crediting up to those hardy highway pioneers who are responsible for the national run from Atlanta to New York city, reversing the route of last year. It is singularly apropos that this Atlanta-New York affair, dedicated to the good roads cause, should end just as the Glidden tour starts from Cincinnati, for it keeps alive the wave of good roads enthusiasm that is sweeping over the country and which already has done immeasurable good.

ALREADY it has been demonstrated just what good has been done the cause by the eastern demonstration. When sixty-five owners can leave their businesses for a week and spend that week traveling 1,100 miles in motor cars to arouse the people to the need of good roads, that speaks volumes for the advances the cause is making. And when one remembers that the people, too, have caught the fever, then one really appreciates what hustle and energy can accomplish. As for the Glidden results one hardly can tell now. It was clearly apparent that the pathfinding trip stirred the countryside. The tourists when they left Cincinnati Tuesday morning got a taste of it, for that first day's journey was marked by roads that had been specially prepared for the Gliddenites. Committees had been at work and from Cincinnati to Louisville there was one broad ribbon of sandpapered highway that made the tourists dread leaving it. What lies ahead on the long trail through Dixie remains to be seen, but at any rate the American Automobile Association can pat itself on the back and be well satisfied with the missionary work that has been accomplished.

OUTCRY FROM MEXICAN RUBBER PRODUCERS

Concerns Making Tire Material from Guayule Shrub Organize —Discrimination Is Charged

TERREON, Mex., June 12—The manufacturers of crude rubber from the guayule shrub are forming a strong organization which has for its purpose the fixing of the price that shall be paid for the product and to protect themselves against the discriminations which they allege are being practiced against this kind of rubber in the principal markets of the world, particularly the United States. The guayule rubber manufacturing companies and individuals composing this new combine represent a capital aggregating about $65,000,000 gold that is now invested in the industry in northern Mexico. The combined capacity of the manufacturing plants is about 300 tons of crude rubber daily. The reports of the different factories show that those located in the state of Coahuila alone had outputs aggregating $12,000,000 in value during the first 4 months of this year, and this is to be still further increased by the erection of new factories of large capacities.

The chief concern interested in the movement to improve the prices and market conditions of the crude product are the Continental-Mexican Rubber Co., of Torreon; the Compania Explotadora Coahuilense, of Parras; the Mexican Crude Rubber Co., of Viesca; the Compania Ganadera de la Merced, of Cuatro Cienegas; the Compania Guayulera de Torreon, S. A., of Torreon; the Compania Eulera Mexicana, of Gomez Palacio; La Internacional Mexicana, of Torreon; the Compania Hulera de la Laguna, S. A., of Torreon; the Compania Huayulera Nacional, S. A., of Gomez Palacio; the Compania Mexicana Explotadora de Hule, of Torreon; Othan Kateerfeldt, of Gomez Palacio, and Enrico Northoldt, of Torreon.

In addition to these concerns it is expected that the rubber manufacturers of the state of Zacatecas will join the organization. Some idea of the importance of this new industry to Mexico may be had when it is stated that in the cutting, packing, freighting and general hauling of the shrub and in its manufacture into crude rubber employment is given to 11,500 men, exclusive of the office force of 1,143 persons. The daily payroll aggregates about $30,000.

The complaint of the manufacturers is that the foreign dealers and brokers in rubber arbitrarily fix a price on the guayule rubber considerably below that which is paid for the Para product and that of the rubber trees in other parts of the world without regard to the relative difference in the caoutchouc properties of the two products. The fact is cited that while the rubber tree product is accepted on a basis of 90 per cent on its gross weight, an allowance of only 48 to 50 per cent on its gross weight is made for guayule rubber. It is claimed that an analysis of guayule rubber shows that it averages 76 per cent caoutchouc, the manufacturers being therefore deprived of practically one-third of the value of the product in its sale. When the Para and other rubber tree products were selling for $1.25 a pound offers of 80 to 90 cents per pound were made for guayule rubber. It is the purpose of the guayule rubber combine to demand an equalization of the prices which will place their product on a parity with that obtained from the rubber tree.

PROGRESS OF FLAG CAR

Detroit, Mich., June 13—Progress of the Flanders Under Three Flags car, which is running from Canada to Mexico, is told in the following telegrams from Paul Bruske, leader of the expedition:

Prescott, Ont., June 10—The first rainless day and the first real roads of the trip combined today to help the Flanders 20 on its first century run. The car made but 20 miles, from Cascade to Lancaster, in the forenoon, the run being through a marsh and the road very dangerous and rough, but the highways dried rapidly as the day progressed and from 1 o'clock to 6 o'clock the car covered 80.3 miles of road, which, while designated as fair to bad in the road book, looked like asphalt after the experience in the province of Quebec. The route of the afternoon ran through Cornwall, Iroquois and Cardinal, along the St. Lawrence, and included fine views of the rapids, islands and canals.

Trenton, Ont., June 11—All the farmers of western Ontario apparently spent Friday in placing a lot of purely superfluous crushed stone on their already excellent roads and then put in Saturday going to and from town. But for this combination the Flanders would have been some 50 or 70 miles nearer Mexico than it was when it pulled in here at 6:30 tonight. The fresh stone held the speed down and the farm rigs and wagons always received the courtesies of the road, which often included a dead stop and the services of one of the crew to lead past a fractious beast, murmuring the while soothing words. At that the car covered 119 miles for the day. It rained practically all afternoon and part of the morning, but that is the regular diet here apparently and the tourists are getting used to it. The itinerary of the day from Prescott to Trenton included some beautiful scenery and the towns of Brockton, Gananoque, Kingston and Belleville.

Toronto, Ont., June 12—The crew of the Flanders refused to travel without breakfast this morning and did not get out of Trenton until 11 o'clock as a result, that being the earliest possible moment at which the hotel people could be induced to feed them. When they did get started they made up for lost time, traveling at a regular clip of 20 miles an hour over clay and gravel roads to Toronto, which was reached well before the afternoon was spent. The day's run was 113 miles. No rain fell throughout the day, a sensational feature at Oshawa, Ont. The car was held up for 20 minutes by a Decoration day celebration, which seemed to include every man, woman, child and buggy horse for 20 miles around, and which had just started to disperse as the car whizzed along toward the cemetery from the town.

Ridgetown, Ont., June 13—The Flanders pulled into this town about supper time after covering 180 miles for the day on roads that average slightly better than fair. The tourists passed through the towns of Hamilton, Brantford, Woodstock, Ingersoll and London and retired for the night very much elated over the progress made during the day, which was the greatest made so far since the long grind began. The trip through this Canadian prosperous section was in the nature of an ovation, the flying couriers being met at the outskirts of almost every village and city by owners of E-M-F cars, who escorted them along the way. Notwithstanding these interruptions, the car averaged between 18 and 20 miles per hour between Ridgetown and Toronto, and Bruske and Lane expect to complete the Canadian leg of their strenuous trip by arriving in Detroit Tuesday afternoon.

Detroit, Mich., June 15—Covered with thick Canadian mud, the Flanders 20, which is making a trip from Quebec to Mexico City, ran into this city, yesterday afternoon, concluding the first or Canadian leg of the long journey. The car was welcomed by Mayor Breitmeyer, and, after proceeding to the Pontchartrain, made a trip around the city escorted by 1 day's factory output of Flanders cars, about forty in all, and twice as many more privately-owned Flanders cars. The procession went up Woodward avenue to Grand Circus, to Michigan avenue, around the city hall and back to the hotel, where it stood on exhibition for the balance of the afternoon. Bright and early this morning the car started on its way for Mexico via Toledo, Indianapolis, and St. Louis. The car started from Quebec on June 6, so has been on the road 9 days. Although little progress was made the first few days, the last 3 saw a distance of 412 miles covered, an average of 137 per day. As yet, the car has had no trouble, despite terrible roads encountered by Lane and Bruske in Canada.

June 17—Track meet at Memphis, Tenn.
June 18—Track meet of Quaker City Motor Club, Philadelphia.
June 18—Automobile Club of Maryland's hill-climb, Baltimore, Md.
June 18—Hill-climb of Upper Westchester A. C., Ossining, N. Y.
June 28-29-30—Three-day reliability run of St. Louis Automobile Manufacturers and Dealers' Association for Star trophy.
July 1-2-4—Speedway meet at Indianapolis.
July 1-10—Road carnival of licensed dealers at Los Angeles, Cal.
July 2—Reliability run of North Wildwood Automobile Club, Philadelphia.
July 4—Track meet of Motor Club of Wildwood, N. J.
July 4—Track meet of Dallas Automobile Club, Dallas, Tex.
July 4—Track meet of Cheyenne Motor Club, Cheyenne, Wyo.
July 4—Hill-climb of Automobile Club of Auburn, Auburn, N. Y.
July 4—Track meet of Minnesota State Automobile Association, St. Paul.
July 11—Hill-climb of Plainfield Automobile Club, Plainfield, N. J.
July—Hill-climb at Richfield Springs, N. Y.; middle of month.
July—Road race of Grand Rapids Automobile Club, Grand Rapids, Mich.; middle of month.
July 18-23—Milwaukee Sentinel trophy. Tour of Wisconsin State Automobile Association.
July 30—Track meet of North Wildwood Automobile Club, Wildwood, N. J.
August 1—Reliability run of Minneapolis Automobile Club, Minneapolis, Minn.
August 1-September 15—French industrial vehicle trials.
August 4—Annual hill-climb of Chicago Motor Club at Algonquin, Ill.
August 15—Start of Munsey tour.
August 17—Track meet at Cheyenne, Wyo.
August 31—Reliability run of Minnesota State Automobile Association.

De Palma Conquers Giant's Despair

WILKES-BARRE, Pa., June 14—Special telegram—Cheered on by 50,000 people, Ralph de Palma, driving his big 200-horsepower Fiat up the famous Giant's Despair course this afternoon, established a new record for the hill, in the fifth annual hill-climbing contest of the Wilkes-Barre Automobile Club, and won the free-for-all. The new mark he set is 1:28⅘ for the mile course, with its grades, which at places are as great as 22 percent and its sharp and dangerous curves at the Devil's Elbow, the mountain house and the S turn. He was the choice of the people for the record-breaking owing to the power of his machine and the fine showing he made on the course last year, so the hill rang with applause when it was announced that he had done the trick.

Despite the fact that the events were postponed, owing to the rain, from Saturday until Monday, and then from Monday until today, the largest crowd that ever witnessed a climb up the hill lined the track. Motorists came from all sections of eastern Pennsylvania, lower New York state and northern New Jersey, and thousands of machines dotted the hillside, while people started up the course at 6 o'clock this morning to watch the practicing of the cars in the morning and the races in the afternoon. These were started by the official starter, Fred J. Wagner, only 7 minutes later than the hour set, 1 o'clock, and were concluded by 5 p. m. The free-for-all was the event of the day and twelve cars entered it. The Fiat, conceded to be the winner, proved that the judgment of the throng was right, while the Chadwick, driven by Len Zengel, made great time up the hill and took second place in 1:37. The Knox Giantess, with Disbrow at the wheel, was a little more than 8 seconds slower and won third place. These two cars also maintained their respective positions in the invitation event, a sort of consolation for the drivers who did not win in the free-for-all, and from which the champion Fiat was barred. Zengel took first place in the invitation by daring driving around the sharp curves and by getting great speed out of his car in the straightaway, making the climb in 1:37⅗, practically the same time as in the free-for-all, while Disbrow, with the Knox Giantess, got to the top in second place in 1:44⅗. A Matheson six was in third place.

The famous Hollenback, $1,000 trophy was won by Fred Belcher, who drove a Knox runabout, and who went up the hill like a demon, striking the curves with great speed and bounding over the steep finishing stretch, making the top in 1:53⅗. A Knox car also won the event last year, and if a Knox wins it again it will take permanent possession of the trophy. The Knox people took a large share of the prizes for the day, too, getting three firsts out of nine events, two seconds and a third.

In the Hollenback, the Matheson six, which is manufactured here, took second place in 2:00⅘, while a National 40, driven by Kincade, was third.

The Knox Giantess, driven by Disbrow, won the big stock car event, getting over the course in 1:47⅗, while the two Nationals, driven by Aitken and Wilcox, were a close second and third. The Knox runabout, so ably handled in other events by Belcher, won the stock car event for a smaller size with a Marmon and a National, driven by Harroun and Aitken in second and third places, while the two smaller car events were won by the Marmon, with Harroun at the wheel, and the Oakland, with Bauer driving.

There was much interest in the two Wilkes-Barre Automobile Club events. The one for cars costing under $2,000 was won by Habblett, driving a Marion, with Donley in a Maxwell second, and Costello, in another Maxwell, third, while the other event, for cars costing more than $2,000, was won by the Matheson six, with Turner driving. Belcher, in his Knox, being in second place, and Aitken in a National in third.

Only one unfortunate feature marked the day. It was in the free-for-all and the 120 Benz, driven by Ed Hearne suffered. He got a fine start and was expected to beat the time of the Benz last year, which established a record of 1:31⅘ for the climb, but something went wrong with the timing apparatus and the signal did not sound until he had gone a hundred yards or so beyond the tape. He could not be stopped until he reached the top of the hill, and then when he came back and tried it a second time his jackshaft was broken and he had to stop, after going a little distance up the hill. He could not make repairs in time to get into the race again.

Despite the large crowd, the events were run without any one being injured. Only two cars went into the ditch, a Warren-Detroit, driven by Tom Berger, and the Otto car of Philadelphia No. 13, driven by George H. Jones, which ran into a ditch on the way down the hill. Summaries:

EVENT 1, 161-230 CLASS

Car	Driver	Time
Oakland	H. A. Bauer	2:17⅘
Reo	Frank Martz	2:21⅕
Maxwell T	T. M. Costello	2:55
Maxwell Q	M. P. Donley	3:01⅘

EVENT 2, 231-300 CLASS

Marmon 32	Ray Harroun	1:50⅕
Pope-Hartford	Robert Johnston	2:05
Pullman	H. P. Hardesty	2:05⅗
Pope-Hartford	B. C. Fincke	2:12

EVENT 3, 301-450 CLASS

Knox runabout	Fred Belcher	1:52
Marmon	Ray Harroun	1:54
National 40	J. D. Aitken	1:54⅖
National 40	Thomas Kincade	2:00

EVENT 4, 451-600 CLASS

Knox Giantess	L. A. Disbrow	1:47⅗
National 40	J. D. Aitken	1:55
National 40	R. Wilcox	1:58⅗

EVENT 5, NOT FILLED

EVENT 6, 601-750 CLASS, $2,001 TO $3,000, HOLLENBACK TROPHY

Knox runabout	Fred Belcher	1:53⅗
Matheson six	Guy Reynolds	2:00⅘
National 40	Thomas Kincade	2:01⅗

EVENT 7, FREE-FOR-ALL

Fiat	Ralph DePalma	1:28⅗
Chadwick	Len Zengel	1:37
Knox Giantess	L. A. Disbrow	1:45⅘
Knox runabout	Fred Belcher	1:55⅗

EVENT 8, NOT FILLED

EVENT 9, INVITATION CONTEST

Chadwick	Len Zengel	1:37⅗
Knox Giantess	L. A. Disbrow	1:44⅗
Matheson	John Turner	1:48
National 40	Thomas Kincade	1:53⅕

EVENT 10, UNDER $2,000, WILKES-BARRE CLUB

Marion	Edward Habblett	2:19⅗
Maxwell Q	M. S. Donley	2:46
Maxwell T	T. M. Costello	2:55⅘
Regal	W. C. Moore	3:05⅗

EVENT 11, OVER $2,000, WILKES-BARRE CLUB

Matheson six	John Turner	1:46⅗
Knox	Fred Belcher	1:51⅕
National	J. D. Aitken	1:52
Pope-Hartford	Robert Johnson	2:04⅘

BEAUTIFUL ROADS ENCOUNTERED IN CAROLINA RELIABILITY RUN

BADGERS PREPARE FOR RUN

Milwaukee, Wis., June 13—The Wisconsin State Automobile Association has selected officials for the first annual tour for the Milwaukee Sentinel trophy, July 18 to 22 inclusive. The official referee is A. R.

Barker, of Portage, Wis., and the starter James T. Drought.

Merrill, Wis., has made such vigorous demands to be included in the 780-mile route that President Moore, who blazed the original trail, went to Eau Claire, Wis., the night control for the third day's run, on Monday of this week to find another path which will include Merrill and make it a noon control. This, the fourth day's run, will be the longest of the tour, covering about 205 miles. A new route from Monroe to Madison will be laid out because of bad roads. Beaver Dam will be omitted from the last day's run.

The tour has aroused intense interest throughout the state, and especially in cities that will be on the route, as is made evident by the fact that since May 1, 1910, 344 members have been added to the association's list, bringing the total up to 1,000. The new membership is divided as follows: Eau Claire, 68; La Crosse, 52; Whitewater, 5; Columbus, 20; Janesville, 21; Ripon, 4; Macfarland, 3; Merrill, 2; Green county, 44; Oakfield, 18; Manitowoc, 52; southwestern Wisconsin counties, 44; individual, 11. Several clubs are now being formed. Secretary Drought, of the W. S. A. A., assisted in the organization of a club at Sturgeon Bay, in extreme northeastern Wisconsin, on June 11.

MEET AT KANSAS CITY

Kansas City, Mo., June 11—After several postponements the track meet at Elm Ridge was run this afternoon with Oldfield and Strang among the stars competing. A crowd of 5,000 people saw Oldfield make three attacks upon the world's circular track record in his big Benz. Oldfield did not clip de Palma's mark but he did put up three most creditable performances in :52 1-5, :52 2-5 and :53 1-5. Kerscher in the old Darracq also had a try at the mark, doing :53 2-5. In the Knox Oldfield was most successful, winning two races. One of them was a 5-mile free-for-all, in which Strang in a Jackson and Miller in a Warren-Detroit followed Oldfield home. The time was 6:02 1-5. In the 50-mile free-for-all Oldfield won in :56.07, with LaRoche in a Cutting second, in :59.04, Clark in a Cutting third, :60.04, while Strang in a Jackson and Miller in a Warren-Detroit brought up the rear. The 5-mile free-for-all handicap was won by Therman in an Auburn with a handicap of 70 seconds. Clark in a Cutting was second and Miller in a Warren-Detroit third. The time for the winner was 5:48 2-5. The rest of the meet consisted of exhibitions by Oldfield and Kerscher, and a motor cycle race.

ANOTHER NEW SELDENITE

New York, June 14—With the granting of a license to the Midland Motor Co. of Moline, Ill., just announced, there are now eighty-two different makes of cars licensed under the Selden patent.

Buick Winner of the Carolina Run

RICHMOND, VA., June 13—The Carolina endurance run, promoted by the Times-Dispatch, undoubtedly was one of the most splendid successes that the sport has known in this portion of the south. Ten out of fourteen starters finished the 409-mile trip in good form, despite the fact that the last day's run was made through a rainstorm that not only drenched the drivers to the skin, but made the roads in some places practically impassable.

Although there were twenty-five cars entered, only fourteen reported for the start on Tuesday morning, the remainder having been withdrawn for various reasons. Many of the parties entered included wives, daughters and sisters of the owners.

The Buick, owned and driven by L. M. Foster, was the winner of the chief trophy, having made the run with perfect road and mechanical scores. In division 2 Dr. Samuel MacAnnally won with his Maxwell, which had 123 points charged against it. The only other contestant in this division, the Hupmobile, had 243 points against it. In division 3, E. C. Pelouze in a Chalmers 30 was the winner, with 35 points. No. 12 Chalmers had 196 points and the No. 15 Regal and No. 16 Maxwell were disqualified. In division 4 the winner was L. M. Foster, with the Buick, which was perfect. No. 6 Rambler had 43 points, No. 13 Buick 98, and No. 18 Buick 224. The No. 3 White was disqualified and the No. 4 Buick did not go through the final examination. In division 5 No. 24 Speedwell, owned by John D. Alsop, was the winner with 20 points against him.

One of the big features of the 4-day trip was the hospitality shown the entrants by the people of Virginia and North Carolina at every checking point. It was a gay whirl of receptions, feasts, barbecues and every other sort of the best of good times at every stop along the entire route, with the last point always making a strong bid to outdo the preceding one.

To one thing was the attention of the party particularly drawn—the superiority of the North Carolina roads over those of Virginia. With a few exceptions a few miles out of South Hill and Lawrenceville the roads of Virginia were found to be indescribably bad. In many places mudholes 2 feet deep were encountered, through which it was necessary for the drivers to work their cars with rare care and judgment to prevent serious accident, while in other huge boulders that had been lying in the same identical spot since the first Indian trespassed upon the property of the prehistoric race were encountered, and around which it would have puzzled a snake to have found its way.

North Carolina is far more progressive in its road-building than is Virginia, for Virginia has no roads that can compare with those in Franklin and Durham counties, North Carolina. The people down in Carolina believe in good roads.

Richmond, Va., June 14—Because of the protests of John B. Alsop and Howard Wagner, of the Speedwell Motor Car Co., who assert that their Speedwell was illegally penalized in the Times-Dispatch North Carolina endurance run, the award of the prizes will be postponed until the decision of the referee of the American Automobile Association is announced. The committee penalized the Speedwell 1 point each for two motor stops and 18 points for being 18 minutes late at Lawrenceville. The Speedwell owners claim that their motor was stopped once for a frightened team, and the second time by waiting for the pilot car to move on. They deny that they were late in Lawrenceville.

PICTORIAL DEMONSTRATION OF GOOD ROADS IN NORTH CAROLINA

Few Clean Scores in Good Roads

NEW YORK, June 14—Gayly decked with flags and streamers of all colors and bearing evidence of their unusually hard experience on the long trip from Atlanta, in dusty bodies and muddy running gear, sixty-five of the seventy-three original starters in the national good roads tour, held under the auspices of the New York Herald and Atlanta Journal, swung past the reviewing car in front of the Herald building last night and were formally dismissed after being checked.

Many occupants of the cars still wore their travel-stained clothing, but a number had taken advantage of the stops along the way to refresh their appearance, especially the women, and at the finish of the long run they looked as if they had only motored from the city hall. But the cars seemed like veterans just in from a hard campaign. Their official numbers and banners were awry and in other ways they showed the effects of their experience up in the mountains and across the terrible roads in the vicinity of Gettysburg. But their motors were running smoothly and true and, as far as their efficiency was concerned, a large majority of the machines seemed perfectly capable of duplicating the trip without repairs.

Though no official announcement of the results of the competition will be made until later, it may be stated unofficially that seven cars had perfect scores for the whole trip at the end of the journey. They are:

Class 2—No. 19, Ford, E. M. Willingham, Atlanta, owner and driver. Roy Abernathy, passengers; John Orr, mechanician.

Class 3—No. 53, Cadillac, D. K. McColl, Bennettsville, S. C., owner and driver; John Bailey, passenger.

Class 3—No. 57, Mitchell, James A. Gray, Jr., Winston-Salem, N. C., owner; H. B. Gunther and R. H. Rice, passengers; Robah Stowe, driver.

Class 5—No. 49, Pullman, Pullman Motor Co., York, Pa., owner; Norman Gallatin, driver, Thomas O'Connor, son of president of company, substitute; T. P. Wilson, passenger.

GOOD ROADS TOURISTS STARTING FROM ATLANTA FOR NEW YORK

Class 6—No. 13, Pope-Hartford, Ed. H. Inman, Atlanta, owner; A. L. Almand, driver.

Class 7—No. 6, Pope-Toledo, Edward M. Durant, Atlanta, owner and driver; Mrs. Durant, Miss Lulu Ross, of Rome, Ga.; Armand Durant, Ross Durant and E. G. Clapp, passengers.

Class 7—No. 30, Lozier, Asa G. Candler, Jr., Atlanta, owner; Henry C. Heinz, John S. Cleghorn, Ben Lee Crew, passengers; F. H. McGill, Jr., driver.

The run proved a trying experience for both cars and tourists, for from one end of the 1,100-mile journey almost to the other rain and every other possible variety of weather was encountered in lumps, excepting always, however, the good varieties. Sixty-five of the original starters trundled past the finishing mark, while eight cripples were left at various points en route, forced to yield to the exigencies of Jupiter Pluvius and accidents of the road running out of the south.

It was not a pleasure jaunt by a large majority, and, while a handful of the cars managed to get through without road penalties, the few that were so fortunate bore a small proportion to the full list of contestants. The effect of such a tour cannot help but be an aid to good road-making throughout the country and especially in the sections traversed by the route of the tour. The purpose of the enterprise was to foster and crystallize sentiment for good roads, the importance of which is universally recognized.

The reception of the tourists at New York was completed upon elaborate lines. The final day's run from Philadelphia was accomplished over excellent roads, the quality of which is reflected in the fact that forty-eight of the contesting cars had perfect road scores for that section of the trip.

The head of the column reached Perth Amboy ready to cross to Staten Island before noon and the Richmond County Automobile Club was summoned in a hurry to act as escorts. It had not been thought that the tourists would arrive in this vicinity until later in the day and the early appearance of the cars caused a lively scurrying among the club members.

The cars made a quick run across Staten Island, where the official reception was held at St. George's. Mayor William J. Gaynor of New York was the chief of the official reception party and extended a notably warm welcome to the tourists. In his speech the mayor said that such enterprises as the good roads tour were potent factors in wiping out boundary lines and bringing about even more cordial relations between the various sections of

POPE-TOLEDO AT LANCASTER ON THE WAY NORTH

Tour From Atlanta to New York

ATLANTA-NEW YORK TOURISTS CHECKED IN AT CHARLOTTE, N. C.

the United States, thanks to the motorists.

George Cromwell, president of the borough of Richmond, and James R. Gray, publisher of the Atlanta Journal, made addresses in response to the talk of Mayor Gaynor. Colonel Gray also made the speech of presentation by which a silver loving cup was given to Mayor Gaynor by Robert F. Maddox, mayor of Atlanta. After the luncheon, which was served at Hugot's Gardens, the travelers took up the way again and the column embarked upon ferry boats and proceeded to Manhattan.

Escorted by between 200 and 300 volunteer cars, the tourists trundled slowly from the ferry to the city hall, where they passed in review and then moved slowly up Broadway to Herald square, where they wheeled, saluted and were dismissed.

Stationed in front of the Herald building, a big motor truck containing the Protectory Boys' band stood during the final review, and the musicians put a lot of enthusiastic feeling into their rendition of popular and southern melodies. Today the tourists slept late and in the afternoon went over to Coney Island in a body to enjoy the lively amusement place and a shore dinner.

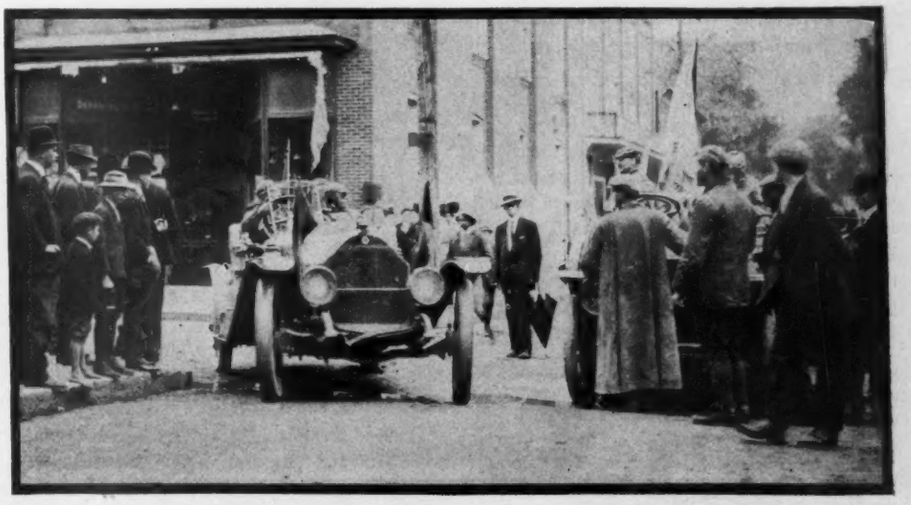
The tour started from Atlanta Monday, June 6, with sixty-nine cars entered in the contesting classes. It was sprinkling then and during the first day's run the roads were muddy, but not particularly bad. This was largely due to the immense amount of work that had been done upon them in preparation for the tour. Eight cars suffered penalties during the first day, but all the starters managed to get in, even if a few were late at night control.

The next day the roads were somewhat better and at the night control at Charlotte, N. C., it was found that nine cars had incurred road penalties. The third day was the best of the run, except the final stretch of roads across New Jersey. The route lay between Charlotte, N. C., and Martinsville, Va., 145.6 miles, and, despite threatening weather, the going was not nearly as bad as was encountered later, up near Gettysburg.

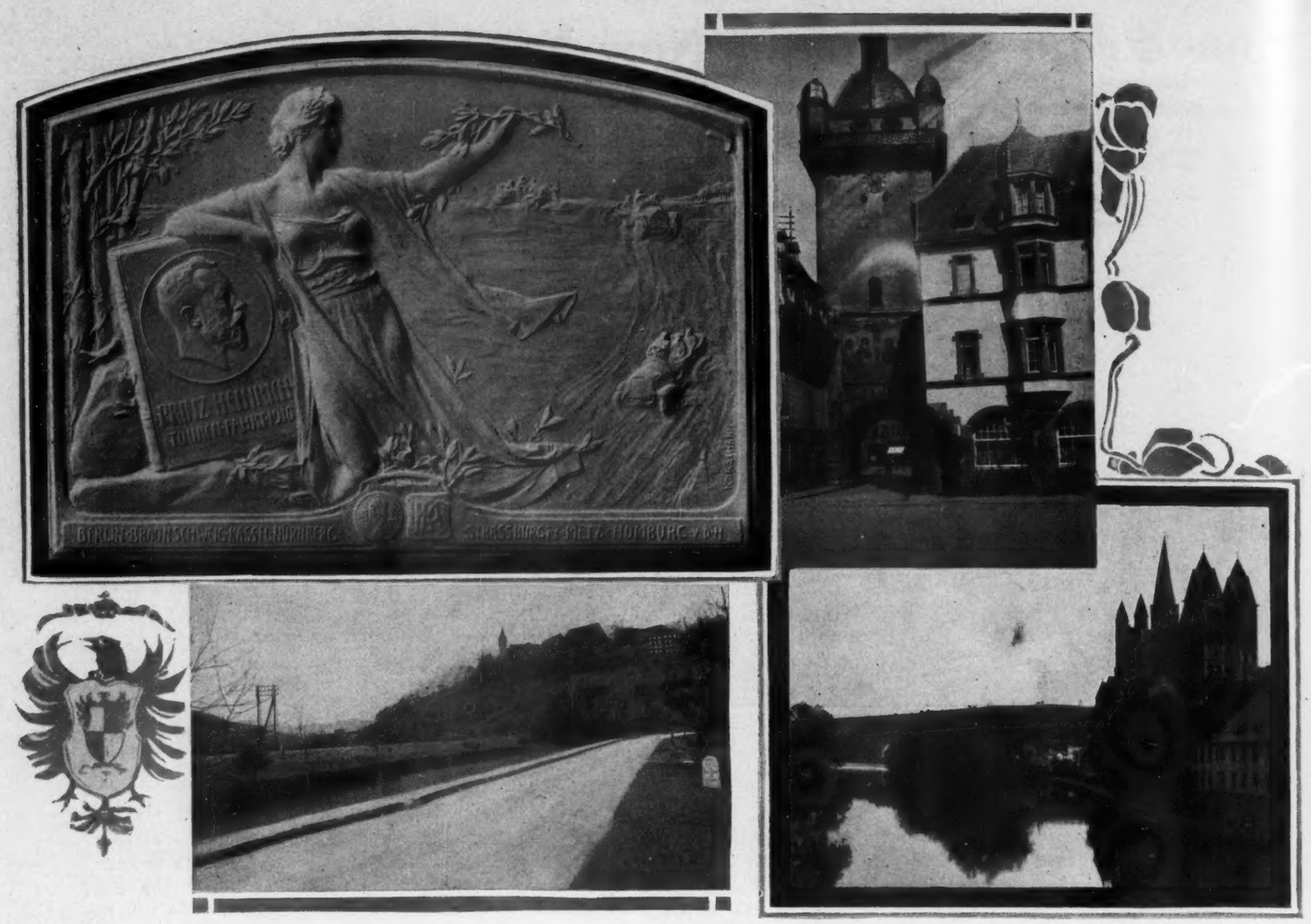
The fourth day from Martinsville to Staunton, 184.3 miles, brought about the downfall of twenty-eight cars. Until noon control at Roanoke the going was negotiable, but from Roanoke to Staunton the tourists were given about as rough treatment by the elements as possible. The rain burst out of the low hanging clouds and deluged the roadways, making trails, ordinarily passable in comfort, a series of slippery planes. Skidding from one side of the road to the other, the contestants came down the steep grades in peril of their lives. Hairbreadth escapes were numerous, but, marvelous as it may seem, accidents of a serious nature were happily avoided. As it was, several cars were ditched on this section of the run, and so difficult the going proved to be that the official cars were unable to keep any kind of a check upon the column and at the finish of the day's run only forty cars put in an appearance. The officers were obliged to transfer their flags from one car to another, on account of the penchant developed on the part of the cars to stall in out-of-the-way places along the road. Only six cars came through this fearful ordeal on time, but later it was announced that an allowance of 41 points would be allowed those penalized, on account of the troubles of the officials.

The fifth day of the tour was to Gettysburg, and those who passed over the sodden, rough and dangerous roads want to forget their experience as soon as possible. Despite the bad roads, twenty-seven cars made clean scores and fully fifty reached the night control. The sixth day was from Gettysburg to Philadelphia, which was negotiated slowly but safely. Stragglers kept coming in until Sunday evening, when fifty-five of the original sixty-nine contesting cars marshaled in the Quaker City. Monday morning these cars and ten official cars commenced the final day's run, reaching Staten Island before noon, only seven being subject to further penalization for work done on them on the homestretch.

"Naturally, I am greatly pleased over the sustained enthusiasm of every participant in the tour, in spite of the terribly raw deal they had at the hands of the weather man, but more than ever am I gratified to learn the far-reaching effects resulting from the holding of this Atlanta-New York run." Thus did Major John S. Cohen, of the Atlanta Journal, father of the tour and the Atlanta-New York highway proposition, summarize the holding of the second tour.



PALMER-SINGER PASSES THROUGH GETTYSBURG CONTROL



PRINCE HENRY TROPHY OFFERED IN GERMAN TOUR—OLD CITY GATE IN SCHLETTSTADT
ROAD LEADING INTO LORCH, WITH CONVENT ON TOP OF HILL—CATHEDRAL OF LIMBURG

Germany's Big Prince Henry Tour

BERLIN, June 13—Special cablegram. —The third annual Prince Henry tour has been brought to a successful ending and the winner has been declared to be Fred Porsche, of Wiener-Neustadt, who drove an Austrian Daimler, which was one of the ten cars entered by that concern in the German classic. The Daimlers carried off the honors of the contest by not only securing first place, but running second and third as well. An Opel was fourth and a Benz fifth. Of the 121 cars that started in the tour, eighty-seven finished.

As a result of the victory of the Austrian Daimler, there will be a drawing to see which concern becomes a permanent owner of the Prince Henry trophy, in which the Austrian Daimler, Horch and Opel will participate. The trophy was put up for 3 years, and according to the terms the manufacturer who won it twice owned it, or failing in this, lots were to be drawn at the end of the 3 years to see who got it. This is the third tour, and as neither the Horch nor the Opel, which won the 1908 and 1909, won, it will be necessary to hold the drawing. This does not mean the death of the tour, however, for Prince Henry already has advised the Kaiserlicher Automobile Club that he will present another trophy for next year.

In next year's tour there will be a considerable revision of the rules, and it will be strictly a reliability tour, without any speed trials, if the suggestions of the German Motor Car Manufacturers' Association are listened to by the club. The makers hold that speed trials in connection with the tour leads to the construction of cars built for speed purposes only. Therefore, they desire that speed trials be eliminated hereafter.

There was great rivalry among the German makers this year, and the leaders made big entries. The Austrian Daimler had in ten cars, the Benz thirteen, the Mercedes nine, while the Opel had twenty. The winning Daimler is a 20-horsepower four-cylinder proposition, with a bore of 4.1 inches and a stroke of 6.5. The Horch was not among the contestants this time.

Examining the Cars

Berlin, June 1—Of the 127 cars which were entered for the 1910 Prince Henry tour, 122 passed through the hands of the checkers today, and likely most all will start tomorrow in the first stage of the contest. This has been a most strenuous day for officials and contestants alike, although the latter had the easier end. There were thirty-nine different items which had to be checked or verified on every car, which means a total of 4,758 items to be looked over, as there were 122 cars. The operations started promptly at 6 o'clock this morning and lasted all day.

The impression made by the mighty big regiment of cars is that the tour is more a racing car affair than one for touring cars. With the two speed contests as the most important factors of the tour, it is only natural that every manufacturer made every possible effort to bring out cars which, although complying with the rules and regulations, nevertheless are made specially to be successful in the speed trials. As a result, the cars have bodies made as light as safety will warrant, with arrow-like shaped hoods, with rear body ends specially made to offer the greatest protection against the wind, with all parts of the car arranged or constructed so as to offer the minimum of air resistance. Here are cars with such small radiators that they look like toy cars. There is another with some novel protectors for the

ROUTE THROUGH GERMANY'S FAMOUS BLACK FOREST—TYPICAL SMALL VILLAGE IN FOREST REGION
WINDING ROAD NEAR HAMMELBURG—WHERE SECOND SPEED TRIALS TOOK PLACE IN ALSACE

Won By An Austrian Daimler Car

wheels. Some have steel wheels, some have them of wood; some have wire spokes and others have them of wood. The Austrian Daimlers and the Vauxhall of England have the Rudge-Witworth special wheels. The big Benz cars almost make one shiver at the idea that they are supposed to be touring cars. With their four-cylinder 4.5 by 6.9 motors they are scheduled to cover the 5½ kilometers of the speed trials at 50.6 miles an hour.

It probably will prove of interest to Motor Age readers to see what the manufacturers have been doing this year, as compared with last season, in the way of building their Prince Henry cars. The table given herewith includes only the manufacturers which had cars entered both last year and this year, and gives the number of cars and the bore and stroke:

	1910 Bore	1910 Stroke	1910 No. cars	1909 Bore	1909 Stroke	1909 No. cars
Adler	4.1	5.9	6	4.3	4.7	3
	3.3	5.1	2	3.3	4.9	3
Benz	4.5	6.9	7	4.3	5.9	3
	4.7	5.7	1	4.1	5.1	1
	4.7	5.3	1	3.1	4.7	5
	4.1	6.5	4			
Bergmann	4.1	6.5	6	3.9	5.5	2
	3.3	5.7	2			
Brennabor	3.5	5.9	4	3.1	3.6	1
C. Benz Sons	3.3	4.5	1	3.3	4.5	1
Berliet	4.7	5.5	3	4.7	5.5	1
Austrian Daimler	4.1	6.5	10	4.5	6.1	3
Deutz	4.3	6.3	2	4.9	5.5	1
	3.7	6.1	2	4.9	5.1	1
				4.3	5.1	1
Dixi	3.4	4.3	1	4.9	5.9	1
	2.95	4.7	3	3.9	3.9	1
Delaunay-Belleville	3.3	4.7	*1	3.8	4.8	*1
Flat	3.7	6.1	4	4.6	7.5	4
Mercedes	3.7	6.1	8	4.3	5.5	1
	3.5	5.5	1	3.5	5.5	7
Opel	4.5	6.9	6	5.1	5.5	1
	4.7	5.5	1	4.3	5.9	8
	4.3	6.3	1	4.3	5.5	1
	4.3	5.9	1	4.4	4.7	1
	3.9	6.3	4	3.5	5.9	2
	3.9	6.1	5	2.75	4.9	3
	3.3	5.7	1			
	3.1	5.1	1			
Protos	4.3	4.7	5	4.3	4.7	*2
				4.3	4.7	*2
Presto	4.3	6.5	2	4.7	7.9	2
Puch	3.9	6.3	2	3.3	6.8	1
Raf	4.5	6.3	1	4.3	5.1	4
	4.3	6.3	1			
	4.3	5.5	2			

The cars of other manufacturers entered in 1910:

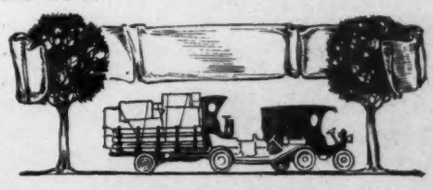
	Bore	Stroke	No. cars
Bugatti	3.9	6.3	1
Dux	2.95	4.7	2
Gaggenau	4.3	6.5	7
Hansa	4.3	5.4	1
Lux	3.5	4.7	1
Mathis	3.1	5.5	4
Stoewer	3.1	5.5	4
Vauxhall	3.5	4.7	3
	3.3	4.5	2

*Six-cylinder

It will be noticed that this year the tendency of the manufacturers has been even greater than in 1909 to bring out motors with a very long stroke and, in many instances, with much reduced bore. By far the most imposing group of cars is that of Adam Opel. The winner of the 1909 tour has twenty cars in the tour.

SEEK PARKS AND BOULEVARDS

Columbus, O., June 13—An elaborate system of parks and boulevards is projected by the residents of East Columbus, O., consequently plans with which to meet the expense of the improvement are now being made. Property owners along Alum creek have been asked to donate enough ground for the desired drives. The matter of improvement has been discussed for some time without obtaining results. Finally an improvement association was formed, with O. A. Miller as president, Dennis Kelley, George Hardy, C. E. Richards and others as officers. It is proposed to raise the sum of $25,000 for the work.



Georgians Hold Good Roads Rally

NEW YORK PREMIERITES LINED UP FOR START OF DAY'S OUTING

SAVANNAH, Ga., June 8—With an attendance of 400 people, the third meeting of the Georgia Federation of Good Roads Authorities started. Several experts were sent from other states, one from Washington, D. C., and several from northern cities. At the meeting the old officers were re-elected, as follows: President, William F. Eve, of Augusta; secretary, J. C. Harper, Augusta; vice-presidents, W. H. Moore, Statesboro, N. F. Tift, Albany, F. Sheffield, Sumter county, R. H. Drake, Griffin, W. M. Gammon, Rome, W. S. Holma, Athens. The place selected for the next convention was Albany.

Those who made speeches were: Mayor Tiedemann, who welcomed the visitors and extended to them the freedom of Savannah; Judge William F. Eve, of Augusta; J. E. Pennybacker, expert from the road department of the department of agriculture; F. H. Opper, an expert on road material; Professor C. H. Strahan, of the engineering department of the University of Georgia; Frank C. Battey, of the Savannah Automobile Club, and Judge W. M. Gammon, of Rome.

After the convention the delegates were taken out to several of the county farms and shown the work being done with convicts. At several of these places lunch was served and a trip made around the 25 miles of the famous road race course. After this a trip was made to the Casino at Thunderbolt, where a banquet awaited them. Here, again, several speeches were made.

Although something like forty cars were entered in the run from Jacksonville to this city, only twelve made the trip, because of an election. The dozen cars that did make the run left that city at 9 o'clock Tuesday morning and traveled over the same course as that used by the Savannah Automobile Club last April. The night stop was Brunswick, and early Wednesday morning a start was made for Savannah. After landing at Darien, the party left at once for Savannah and was met at the Ogechee river bridge, 14 miles from Savannah, at 6 p. m. Every car in the run made a perfect road score. As there were only four prizes, the technical committee got busy examining the cars. The winners will be announced later. Following are those that made the trip: H. Barnes, Oldsmobile; L. C. Oliver, Ford; H. B. Race, Ford; E. Roberts, Overland; H. C. Hare, Buick; O. S. Albritton, Cadillac, J. T. Gore, Cadillac; F. J. Hyde, Jr., Cadillac; George F. Bensel, Cadillac; M. D. Johnson, Oldsmobile; Miss Beulah McMillan, Oldsmobile, and B. A. Coleman, Hudson.

With sixteen cars in line, the Augusta run arrived here Monday night. The cars were met 9 miles out by a delegation of some fifty from the Savannah Automobile Club and escorted into the city. The cars left Augusta early Tuesday morning, at 6 o'clock, and made fast time to Waynesboro. The roads between these two places are in excellent condition and have been improved wonderfully since the run to Augusta. From here the cars continued until Millen was reached, where breakfast was had. The party was the guest of Mayor Daniel and members of the city council.

From Millen the party continued until Statesboro was reached, where dinner was ready and served. The roads between these two cities could be improved, but owing to the long dry spell the road was worse than it would have been had it rained. From Millen a delegate came along to attend the good roads convention. From Statesboro the party went on to Scarborough and found the roads good, but after leaving there the sands became a source of trouble until the line of Chatham county was reached. On reaching Savannah a parade was given around the city, and something like 10,000 people watched the cars as they rolled down the beautiful main street of Savannah on out around part of the grand prize race course until the yacht club was reached, where a lunch was awaiting them. The winners in this run will not be announced until some time next week.

BIG OLDSMOBILE REUNION

New York, June 12—Of the 430 owners who had applied for cards for the annual Oldsmobile reunion yesterday, only 169 were lined up at Broadway and Fifty-first street when the parade to the track started at noon. The turnout was brought up to about 200 cars by the participation of other makes of cars. Six races had been arranged, but the first cars to essay the journey around the muddy, weed-grown course were nearly mired on the backstretch. Then, being that it was a sort of family affair, all the entrants agreed to draw for the prizes instead of racing for them. So the meet was really on the

SOME OF THE OLD TIMERS AT THE OLDSMOBILE REUNION IN NEW YORK

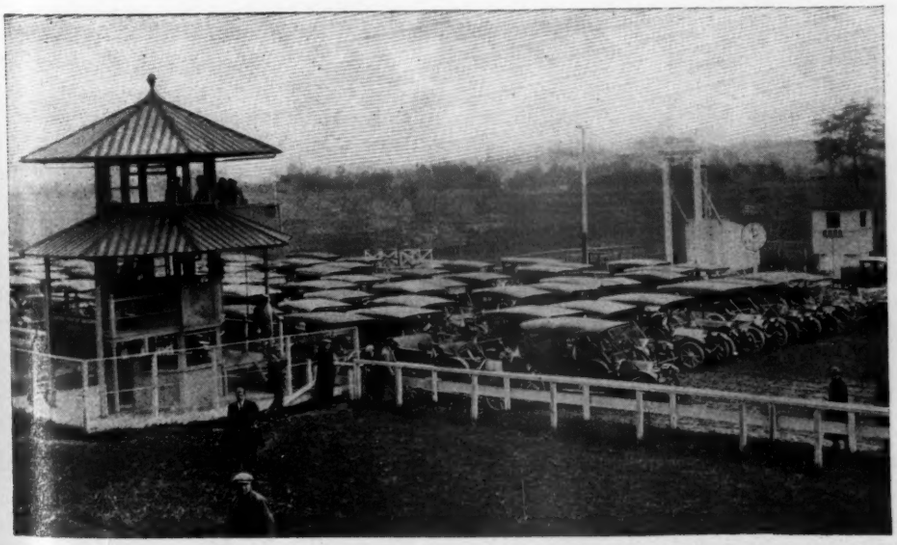
club house lawn instead of on the track.

The event for curved dash runabouts, little cars of the vintage of 1902, 1903 and 1904, was the first on the card. There were twelve of the old timers at the track, and the silver cup offered was drawn by Frank Hurlburt, second prize going to J. H. Muth. For the roadsters, event No. 2, C. F. Brown and Harry Hall drew first and second prizes, respectively. The touring car winners were A. L. Antrim and Maud Hall. Among the entrants for the hare and hound race T. C. Litman and Maud Hall took the trophies, and in the speedometer event, No. 5, W. F. Tilton and T. C. Litman proved the lucky ones.

The one actual contest of the day was a 150 yard foot race for advertising men. The handicaps were based on age. When John C. Wetmore whispered his age to the starter the latter tried to hand him the prize, but Mr. Wetmore insisted on running, and with 28 yards of a start over the scratch man he romped home in front with his half-dozen opponents yards away. The drawing for the 1910 Oldsmobile touring car resulted in A. C. Stein, a real estate man, being the lucky one.

OUTING FOR PREMIERITES

Cape May, N. J., June 12—More than 700 Premier owners and friends in the second annual Cape May outing arrived here today from New York, from Philadelphia, Lancaster, Wilkes Barre, Scranton, Newark and other Eastern cities, leaving Philadelphia in a body this morning. More than $3,000 in prizes were awarded. Heavy rainfalls last night made the roads muddy and dangerous, but all cars finished without mishap. Among the prizes awarded to Premier owners in the Knickerbocker division were: First, Frank J. Lennon, Mount Vernon; second, George G. A. von Sholley, Flushing; third, W. L. Manther, Bay Port; fourth, John D. Scott, Brooklyn; fifth, John Murphy, Mount Vernon; sixth, W. H. Ammermann, New York; hard luck prize to M. W. Coburn, Brooklyn.



NEW YORK OLDSMOBILE REUNION AT EMPIRE CITY TRACK

Big Floral Parade at Portland, Ore.

SECOND ANNUAL PREMIER OUTING—AT JERSEY CITY

PORTLAND, ORE., June 12—Five miles of decorated motor cars, a beaming sun and hundreds of thousands of enthusiastic people went to make up the best showing in the way of a parade ever held in Portland on Wednesday during the annual rose carnival. Portland motorists did themselves proud and established a standard which will be hard to beat. Due credit was also given to the hundreds of other cars from nearby cities, including Tacoma, Seattle, Vancouver, B. C., and of smaller Oregon cities, who threw themselves into the work coöperating with the Portland motorists.

The cars formed into line at Thirteenth and Burnside streets, headed by Police Chief Cox, followed by six officers, each in a small decorated runabout; then came Mayor Simon riding with M. C. Dickinson, president of the Portland Automobile Club, in a car surmounted by a large crown of pink roses; then came E. Henry Wemme, ex-president of the Portland Automobile Club. Mr. Wemme decorated his car as a dirigible balloon. Portland's firemen, with Chief Campbell in charge, carried off first prize in the class in which clubs and organizations were placed. The Portland Elks received the second prize in this class, their car carrying a large elk's head which jutted over the hood of the car and was conspicuously draped with purple and trimmed with white roses.

Probably the best-liked car in the parade was Oliver K. Jeffery's roadster, which was given the palm in the class in which it was entered. Wistarias, their trailing purple masses bunched with beautiful effect, formed the feature of the decorations on his car.

The car driven by Mrs. Walter Cook was daintily outlined in small red roses, and for her skill in the art of decorating she was given second prize in the runabout and roadster class. In the private touring car class W. O. Van Schuyver, winning the grand prize over all, also carried off the trophy. His car was decorated with a mass of bachelor buttons.

Probably the most unique float in the parade was the one representing the O. R. & N. Spokane Flyer, which was built on the chassis of a seven-passenger touring car. The float represented a locomotive and was manned by employes of the road. B. A. Downing, engineer, steered the car, with Frank Kruisinger conductor and F. M. Downey brakeman, acted as the train crew, while three attractive Portland girls were the passengers.

In the motor truck class the entry of the Union Meat Co. was given the first award, with the entry of the White Motor Car Co. second. The latter was an unique structure, a double-decker, with a big touring car in which five pretty girls were seated on top of the truck. Several protests will be filed on account of awards made by the judges,

CINCINNATI ORPHANS' DAY—AT BURNETT WOODS PARK

Peace Declared in Eastern Tag War

WILMINGTON, Del., June 13—As a result of persistent and aggressive work on the part of the Delaware Automobile Association, Delaware has been eliminated from the fight between the city of Philadelphia and New Jersey motorists, which had reached a point where it had become very annoying to Delawareans. In order to insure enforcement of the Pennsylvania law within the city limits and incidentally to keep out New Jersey motorists who sought to come in without Pennsylvania licenses, the department of public safety of Philadelphia about 2 months ago issued an order requiring all cars entering the city without Pennsylvania license tags to be driven to the city hall, where a permit must be obtained before the machine could proceed further. In the case of Delaware this permit did not cost any money, though it resulted in a great waste of time and also in much annoyance. Delaware and Pennsylvania have reciprocal relations, so far as motor cars are concerned, which enables those bearing the tags of either of those states to enter the other with a home tag. The reciprocal period in each state is 10 days. As a result there is the best of feeling between Delaware and Pennsylvania, but just the contrary is the case between Pennsylvania and New Jersey, the latter not being willing to have reciprocal relations, and the result is that a Jersey machine is not allowed to enter Pennsylvania without a Pennsylvania license if it can be prevented.

This is why the city of Philadelphia issued the order requiring a permit for all nonresident machines, and for the same reason the Fairmount park commission a few weeks ago made an order requiring all machines entering the park to carry special Fairmount park license tags, which were obtainable at the city hall and at certain times from some of the guard houses in the park. This also caused a great deal of annoyance and confusion to Delawareans who went to the park, for if they depended upon obtaining a license tag there and happened to strike the wrong gate, they would be required to leave the park and go around it until they came to a place where the tags could be obtained. As was the case with the city authorities, there was no fight against Delaware, but Delaware had to put up with the annoyance just the same until the Delaware Automobile Association was able to revolutionize the whole situation.

The trouble came to a climax the early part of last week, when the department of public safety of Philadelphia directed the police to rigidly enforce the order requiring permits, which had not been enforced prior to that time, though it was issued some time ago.

The city and park matters were both taken up by the Delaware Automobile Association through its executive committee. The association has an attorney in Philadelphia, who also was of assistance. He pointed out to the city authorities that the Pennsylvania law prohibits cities or towns requiring permits in addition to state licenses, and as a result on Friday of last week the order requiring permits in the city was rescinded by the department of public safety, and on the same day the Fairmount park commission rescinded its order requiring special tags for the park. Now all that is necessary for Delaware motorists visiting Fairmount park or the city of Philadelphia is to have a Delaware license tag in plain view on the machine and have the accompanying registration card, to be shown if called for, though the tag is usually accepted without question by the authorities who have an eye on motorists. Delaware owners are well pleased because of the decision.

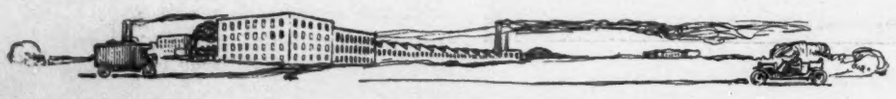
VIRGINIA LAW IN FORCE

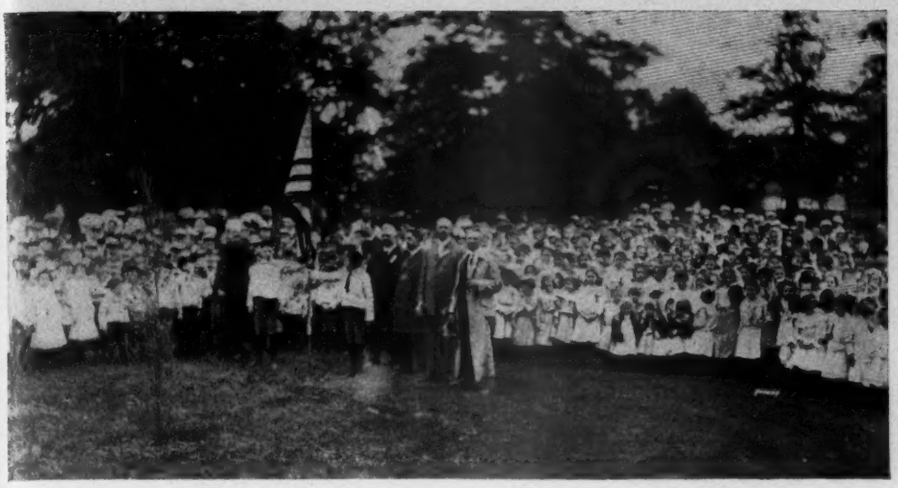
Richmond, Va., June 15—The new law governing motor cars passed by the last legislature of Virginia goes into effect today. Most of the motorists of the state have secured their new cards but there still are some who have not conformed to the law. Formerly there was only a charge of $2 to obtain a number, which was good for the life of the car. The speed limit in the country was 15 miles per hour. Now 20 miles an hour may be traveled, while the following is a schedule of the new fees: Twenty horsepower and less, $5; over 25 and under 45 horsepower, $10; 45 horsepower and over, $20; motor cycle, $2; chauffeur, $2.50; dealers' demonstration license, $50. All old numbers stand annulled after today.

The new law provides that the operator of a car shall not drive in the corporate limits of any city or town at a rate of speed greater than 12 miles an hour, unless the local ordinance of such city or town shall provide otherwise. Outside the limits of any city or town a speed of 20 miles an hour is permissible, except going around curves, down sharp declines, or at the intersection of any crossroads, or over the crest of hills, or in passing other vehicles or riders on roadways, when a rate of speed not exceeding 8 miles per hour must be observed. The law also provides for cases where horses are frightened, stating that upon a signal or request from the driver or rider, the chauffeur shall immediately bring his machine and its engine to a full stop and allow ample time for the rider or driver to pass.

LAYING OUT LONG TRAIL

La Junta, Colo., June 12—The pathfinding party of the Kansas City Star trophies tour ran into La Junta at 6 o'clock tonight in the Stevens-Duryea, driven by M. C. Nolan. The route layers traveled over 221 miles at a 26-mile clip today, starting at 9:30 at Dodge City, Kan. The route, which is following the historic old Santa Fe trail from its origin in Kansas City to the western terminus at Santa Fe, was accurately marked along the highway of '49 most of the time today. Besides the granite trail-markers erected by the states of Kansas and Colorado and state historical societies, the pathfinding party came across grassy mounds that mark the ruts of the wheels of prairie schooners and the tread of the oxen. At one place the trail expanded to a width of 200 feet, in which there were knee-deep tracks of nine old freighters. The party has had an almost unbroken relay of pilots since leaving Kansas City June 9, and many times has been escorted by dozens of cars. The projected route of the tour in all is 2,200 miles, which so far has been laid through Emporia, Hutchinson, Great Bend, Dodge City, Garden City, Kan.; Lamar, Las Animas and La Junta, Colo. There are ample hotel accommodations for 200 tourists at each proposed night stop.





CINCINNATI ORPHANS' DAY—MAYOR HELPS ENTERTAIN

Gala Day for Cincinnati Orphans

CINCINNATI, O., July 12—In celebrating orphans' day the Cincinnati Automobile Club got together 215 cars from private owners and took out 2,000 children from all of the city orphanages. The cars were allotted to the different institutions the day previous to the outing, so that owners went direct from their homes to the institutions and there was a general meeting at 9 o'clock in Washington park, where a procession headed by Chief of Police Millikin and followed by all of the orphans' cars paraded through the business section and then to Burnett park, where a band concert was held. After this another trip was made to Chester amusement park, where the children were given all the privileges of the park and where the club served a dinner to all. The outing was one of the best this city ever has had and the prospects are that next year will be quite a good deal bigger.

ANOTHER HOOSIER SUIT

Indianapolis, Ind., June 13—A suit asking $125,000 damages for alleged breach of contract has been filed in the Marion county circuit court by the Marion Motor Car Sales Co. against the American Motor Car Sales Co., of which John N. Willys is president. The latter is a New York corporation soon to be dissolved in a reorganization of Willys' interests. In November, 1908, the Marion Motor Car Sales Co. arranged to control the 1909 output of the Marion Motor Car Co., at the expiration of this contract the American Motor Car Sales Co. arranging to control the 1910 Marion output. Mr. Willys, president of the American sales company, owns a controlling interest in the Marion plant. The complaint states that in June, 1909, the Marion Motor Car Sales Co. began negotiations with the American Motor Car Sales Co. to control the 1910 Marion output, the American company to furnish an estimated output of 1,000 cars at $1,235 net, f. o. b., and to do the necessary advertising. As a guarantee of good faith the Marion Motor Car Sales Co. states it deposited a check of $100 and that the contract was accepted by letter by John N. Willys. The complaint states that the American Motor Car Sales Co. has refused to carry out its portion of its contract. This case has no connection with the suits brought recently in which an accounting and receiver for the American Motor Car Sales Co. were asked. These suits were later dismissed, following an amicable settlement of the controversy.

PICK MISSOURI ROUTE

St. Louis, Mo., June 13—The route for the 3-days reliability run of the St. Louis Manufacturers and Dealers' Association, June 28, 29 and 30, has been selected and details for the contest are fast being completed. The run will be from St. Louis to Hannibal for the first night's control, from Hannibal to Mexico, Mo., for the second night's control, and from Mexico to St. Louis for the third day. The distance is approximately 400 miles. The tour covers one of the best parts of Missouri. Originally is was planned to cross the river from Hannibal into Illinois, but the Buick pathfinding car demonstrated that the contemplated route was too long for a 3-days run. The honor of being the first entrant fell to the Lindsay Motor Car Co., which entered an Inter-State. There will, it is expected, be from sixty to seventy cars in the run.

ENGINEERS TO MEET

New York, June 13—Howard E. Coffin, president of the Society of Automobile Engineers, has announced that the meetings of the society to be held at its convention in Detroit, July 28, 29 and 30, will be the largest ever attended by the engineers. There will be several professional sessions and matters of the greatest interest will be presented and discussed by authorities. Coker F. Clarkson, general manager of the society, this week announced the election of the following new members of the society: David Dwight Rowlands, Rider-Lewis Motor Car Co.; Clarence W. Spicer, Spicer Mfg. Co.; Christian Girl, Perfection Spring Co.; Arthur Holmes, H. H. Franklin Mfg. Co.; Marcus Thompson Lathrop, Halcomb Steel Co.; Henry C. Wilson, Sub-Target Gun Co.; C. E. Redding, Columbia Motor Car Co.; Joseph P. Lavigne, Lavigne Mfg. Co.; Edward R. Hewitt, Hewitt Motor Co.; Tracy Vere Buckwalter, Pennsylvania railroad; H. P. Dodge, Ohio Electric Car Co.; H. C. Colburn, Colburn Automobile Co.; Irving W. Adams, High Frequency Ignition Coil Co.; John A. Mathews, Halcomb Steel Co.; W. H. Cameron, Willys-Overland Automobile Co.; Charles Archibald Ward, Pittsburg Motor Co.; Lars G. Nilson, Nilson-Miller Co.; Hugo C. Gibson, Requa-Gibson Co.; William Fleming Abel, Halcomb Steel Co.

RELIABILITY CAR STILL RUNNING

Boston, Mass., June 13—At 11 o'clock today the E-M-F car, which is doing a reliability and stability test in Boston, making the run through the crowded city streets, had finished just 1 week of it. The motor has not been stopped since it started. The car has traveled 1,445 miles in that time, the brakes have been applied 2,522 times and the gears have been shifted 420 times. It has not been decided just when the test will be stopped.

MUNSEY TOUR ENTRIES

Washington, D. C., June 12—The entry list for the Munsey historic tour was opened this week and the close of the week found nine nominations, as follows: Premier, Premier Motor Mfg. Co., Indianapolis; Columbia, Columbia Motor Car Co., Hartford, Conn.; Selden; Maxwell, T. A. Lambert, Baltimore, Md.; two Washingtons, Carter Motor Car Corporation, Washington, D. C.; Reading, Middleby Automobile Co., Reading, Pa.; Ford, Charles E. Miller, Washington, D. C.; Elmore, Frank Hardart, Philadelphia, Pa. The work of pathfinding the route will begin Wednesday, when an E-M-F touring car, with Tom Skeggs at the wheel, will start from Philadelphia. The members of the pathfinding party are Harry Ward and F. J. Byrne, staff correspondents of the Munsey newspapers, and Nathan Lazarnick, photographer. Historically and scenically this tour will be one of the most notable ever held in this country. Every foot of the way from Philadelphia to Boston, Portland, Plattsburg, Saratoga, Harrisburg, Gettysburg, Baltimore and Washington is endowed with historical associations.

COURT REFUSES TO DISMISS THE VELIE SUITS

MILWAUKEE, WIS., June 14—The Chalmers-Detroit Motor Car Co., the Locomobile Co. of America, the Pope Mfg. Co., and the Pierce-Arrow Motor Car Co. are held subject to the complaint of the Velie Motor Car Co., of Moline, Ill., in its suit for $500,000 damages against twenty-six motor car manufacturing companies which are members of the A. L. A. M., charging conspiracy and restraint of trade by combination. Judge W. J. Turner of the circuit court for Milwaukee county has just given his decision in the matter of the motion to dismiss the suit on the grounds that service and summons was not properly or legally obtained.

The cases against twenty of the companies are dismissed by stipulation. Five companies are held subject to the complaint. The twenty-sixth defendant, the Kopmeier Motor Car Co., of Milwaukee, an agent, was not concerned in this motion. Of the five companies held subject to the complaint, one, the Peerless Motor Car Co., is released because it has been conclusively shown that its relation to the Jonas Automobile Co., of Milwaukee, its agent, upon which service was made, is that of a seller to a purchaser, making impossible the contention that the Peerless company is doing business within this state. The decision is as follows:

These five defendants are foreign corporations, and the plaintiff has sought to get jurisdiction of them by service upon the persons or companies in this city—Milwaukee—who are dealing in the various lines of motor cars manufactured by the named parties. It is contended by the defendants that the attempt to secure jurisdiction by service upon said dealers has failed because they are not, according to law and the rules of practice, within the jurisdiction of this court, and are not within the state of Wisconsin; in other words, that the persons upon whom the service was made are not the agents or were not doing business for the said corporations within this city.

The attempted service was made pursuant to subdivision 13 of section 2637 of the revised statutes of 1898, which provides "That the service may be made. . . . If against any other foreign corporation, or to any agent having charge of or conducting any business therefor in this state."

Taking the return of the officer as to service upon the Peerless Motor Car Co., it says that he made the service "by delivering to and leaving with August Jonas, president of the Jonas Automobile Co., the agent of the said Peerless Motor Car Co., at 414 Wells street, in the city of Milwaukee, Wis." The proof of service as to the other four defendants is the same. So that we have presented as to each upon the record the question, "Is the person upon whom service was made the agent?" and "Was the foreign corporation conducting business in this state through such agent?" If it was, the service is good.

Justice Dodge says: "It is, of course, true that the courts of this state cannot acquire jurisdiction over persons not present in the state, except for the purpose of adjudicating with reference to property or status here located. This is an inherent limitation upon the powers and jurisdiction of the state under our form of government, and cannot be escaped by reason of the local statutes declaring such power."

In other words, the law is that unless the individual or corporation be personally present within the state, no jurisdiction over its person can be obtained.

"It is, however, uniformly recognized that when a person, corporate or natural, does place itself within our territorial limits, jurisdiction over his or its person may be obtained to adjudicate personal liabilities to such an extent as the state statutes may authorize. So long as either maintains physical absence, this state has no right to insist that they must submit questions of more personal liability to our courts; but when they voluntarily come within the state, such immunity no longer exists." Page 641.

Does the record in these cases show that the defendants were physically present within the state at the time of the attempted service or process upon them? Physical presence may arise either by their maintaining an agency for the transaction of business within this state, or by the presence of an officer of the corporation within the state, but, from the nature of the business he is engaged in, his presence must be for and on behalf of the company and not merely in his individual capacity. This is clearly made plain by the opinion of Mr. Justice Dodge.

Two propositions of fact must be affirmatively established before this court acquires jurisdiction:

A—The defendants must be "doing business" within the state."

B—The person served must be transacting business for such foreign corporation, defendant.

The question will be found liberally briefed in volume 85, American State Reports, commencing at page 905, and extending to page 938; and again in volume 23, L. R. A., page 490, extending to 503. The question of who is an agent and what is transacting business has been up several times in this state, and I find that as the statutes in the early years stood it required service upon the managing agent—16th Wis., 220—but later the word "managing" was expunged and the word "agent" left standing alone.

That each of the persons did business upon whom the summons was served is a conceded fact, but was the business transacted within the state of Wisconsin for the defendant, is the question which was principally argued when the matter was presented to the court, and each of the cases are practically submitted upon the written contract existing between the persons served and the foreign corporations; and as the court construes that, so must this question be decided.

I will take up the motions as follows:

PEERLESS MOTOR CAR CO.—This contract seems to have been very carefully drawn, and is divided into various heads by words printed upon the margin. The agreement is that the Peerless company will sell to the dealer—that is, the Jonas Automobile Co. of Milwaukee—and the dealer agrees to purchase a certain number of a certain model of cars, with the right in the manufacturer to substitute other models than the named model, under certain conditions. Then under the head of "Deliveries" it is said: "Complete specifications for said cars are, however, to be furnished to the manufacturer at least 30 days prior to the first day of the month in which delivery is to be made."

Certain other conditions are made, and then the following: "All deliveries by the manufacturer of either motor cars or parts shall be deemed to be complete when the same are delivered on board cars at Cleveland, O." Then under the head of "Terms:" "The dealer agrees to pay the manufacturer for said cars the list price, less a discount; such cars being f. o. b. cars Cleveland, O."

Then it provides for a cash payment with the order, and the balance to be paid on the presentation of sight draft attached to a bill of lading, and that interest shall be paid by the maker on the money left in his hands.

Now, as to parts, the manufacturer agrees to sell to the dealer motor car parts manufactured or handled by it at its list price, less discount, such prices being f. o. b. cars Cleveland, O., and invoices therefor shall become due and payable on the 20th day of the month following the shipment. Then it provides for discounts, and provides that the money on deposit may be used to pay for the parts if they are not paid for at the time stated in the contract; provides for the termination of the agreement if the payments shall not be made; provides for the return of defective parts; contains a guaranty; limits the territory in which the dealer may sell; provides for the delivery by the manufacturer to the dealer of catalogs and printed matter, and that the dealer shall do the local advertising; speaks of the Selden patent; provides for termination of the contract if the dealer shall not keep his agreement; provides that the contract may be terminated by either upon 30 days' notice.

The court cannot see how, upon this contract, it can be contended that the Peerless company is doing business within this state, or that the Jonas Automobile Co. stands in any other relation than that of a purchaser of its cars and repairs. The motion is granted.

LOCOMOBILE COMPANY OF AMERICA.—It hardly seems necessary to take time to discuss the relations existing between this company and its agent, the Schreiber Motor Car Co., of this city. It is clearly an assumption of agency, although the word "dealer" is used instead of "agent." No useful purpose would be served by attempting an analysis of this contract. After setting forth what each of the parties is to do for the other, and in what way the dealer is to represent the manufacturer, it provides in the tenth paragraph "that no obligation of the manufacturer to the dealer exists under this contract except those specifically herein set forth, and that the dealer has no right to bind the manufacturer in any way nor represent it, except to the limited extent herein expressly permitted." Clearly this is a recognition that the dealer is transacting business and doing business for the Locomobile company in the territory assigned to it. The motion is denied.

POPE MFG. CO.—Emil Estberg is appointed as the representative of this company in the territory named, and he is granted the right to sell the Pope-Hartford machine, and he is required to keep one on hand, and he is required to diligently advertise the machine. He is not permitted to sell other unlicensed machines. The contract is not clear as to how the party of the second part is to receive his compensation, but enough appears on the face thereof to lead to the conclusion that the agent either receives a direct commission or gets the property at a discount from the list. The motion is denied.

CHALMERS-DETROIT MOTOR CO.—This contract clearly provides for a sale for a certain number of cars during the designated months, f. o. b. Detroit, payments to be made for all machines by sight draft attached to bill of lading, and if the contract stopped there there would be no question but that it would be a case of sale and purchase; but there are a number of additional clauses that lead me to the conclusion that the dealer is the representative of and transacting business for the manufacturer in the district.

Paragraph G says: "The dealer agrees to use his best efforts to sell within said territory motor cars made by the manufacturer, and to promote and protect the best interests of the manufacturer throughout said territory, and to take proper care of all users of cars made by the manufacturer, whether sold by said dealer or not. He agrees to maintain a sales room and a suitable garage and repair station in Milwaukee, Wis., so that the manufacturer will be properly represented in said territory."

I—He agrees to report to the manufacturer on the first day of each month the name and addresses of purchasers of the Chalmers-Detroit during the previous month, and the serial number.

J—All accounts for parts or extra equipment not included in the original shipment are due and payable on the 10th of the month following shipment; and the dealer hereby agrees to make settlement promptly to the manufacturer on the date mentioned. Then there is a positive agreement that the title to all cars and repair parts and extra equipment shall remain in the manufacturer until paid for by the dealer, with the right to the manufacturer, upon certain conditions, to enter the premises and remove the cars and repair parts and extra equipment.

O—"If the dealer shall violate any of the covenants of this agreement herein contained on their part, or shall fail to pay for any work performed or merchandise or parts sold to them by the manufacturer, or their financial condition shall become such that, in the opinion of the manufacturer, said dealer will be unable to perform the term of the contract," etc.

There seems to be much more to this contract than the bare sale of the merchandise with delivery to be made at the place of manufacture. It is quite full in the opinion of the court as to the acts to be performed by the dealer as the representative of the manufacturer. The motion is denied.

PIERCE-ARROW MOTOR CAR CO.—This contract is quite different to construe. At a first reading it would seem as if it were a mere contract to purchase and sell, but upon critical examination I find that while presumably a definite number of machines were ordered, still the party of the second part can relieve himself from the purchase of the machines by cancellation, as provided in the contract, and from accepting machines ordered in the first instance. So that considering this provision in connection with the other provisions requiring diligence in advertising and marketing the product, it cannot be said to be the intention of the parties that the party of the second part places a definite order for a certain number of machines, but only contracts to take so many machines as he can, by diligence, sell. It further provides a line of credit for parts purchased, and places them on a different basis from machines purchased. Taking the contract together, I am inclined to the opinion that it shows that the dealer was the representative of the manufacturer, although I am not perfectly clear upon this point. The motion to dismiss is denied.

REO COMPANY INVADES COMMERCIAL FIELD

DETROIT, MICH., June 14—One of the largest factory improvements Lansing has seen in several years is announced by the Reo Motor Car Co. This company has decided to engage in the manufacture of popular-priced power wagons, which will mean the erection of several new buildings at the Washington avenue plant involving the expenditure of a large sum of money and the employment of 1,000 more men. In order to meet the demand upon the company for a popular-priced motor delivery car at the earliest possible moment the old buildings on the Bement property recently purchased by President R. E. Olds will be remodeled at once and it is expected that the manufacture of these cars will begin this fall. This plant will be utilized until the new buildings at the Washington avenue plant are completed.

A dividend of $3 per share payable on June 18 has been declared on all stock of record June 15, and President Olds announced that the capital stock of the company will be materially increased soon for the purpose of financing the power wagon branch of the business. In addition to the new buildings to be erected for the delivery wagon department, the company is preparing plans for several other buildings needed to meet the demands upon the pleasure car department. Orders have been placed for sufficient material to construct 2,000 wagons for the first shop order. Two styles will be manufactured. One will be for light delivery purposes, with a capacity of 500 pounds. The larger wagon will have a capacity of 1,500 pounds.

Will Remodel Old Plant

Work will commence at once on the remodeling of the Bement plant and the present plans call for the temporary plant to be in operation this fall and for the completion of cars for delivery in the spring of 1911.

Because of the orders received from the Reo company for castings, the Hildreth Mfg. Co. must double its capacity and employ 100 more men. Plans are already under way for the erection of three new buildings, the erection of which will be commenced and hurried to completion this summer. The Hildreth plant is already rushed with orders. The Atlas Drop Forge Co., which supplies forgings for the Reo, will greatly increase the capacity of its plant at once and to meet the increased demands for its product will employ a number of more men.

Activity in Detroit

Big things, as well as little ones, transpire so rapidly in Detroit that it really is hard to say when the town has had a very busy week, for with the wheels of progress turning all of the time, there is much news each week of real value. Of course, there was the usual run of new companies, a variety being introduced this week. Of the four or five new ones, one, the Detroit Aeroplane Co., was, as its name would indicate, formed for the purpose of building aeroplanes. The Shock Absorber Co. is another one. It will manufacture a patented shock absorber. This company starts with the modest capitalization of $5,000. The Detroit Airless Tire and Rubber Co., the reorganized Dayton Airless Tire Co., which is moving to Detroit, has filed notice of its incorporation, the amount of capital stock being $1,500,000. Another event of the week in this line was the increase by the Demot Car Co., the present stockholders subscribing to an additional issue of $25,000. This money will be used to provide for extensive and much-needed factory alterations.

What will doubtless be a leading firm was incorporated last week under the name of the Hale Motor and Machine Co., which will start right in with good-sized capital, the amount paid in being $125,000. The incorporators are: Charles Ritter, J. C. Hudson, L. J. Brennan, J. E. Dubois, and R. J. Brennan, as trustee, all of Detroit, and S. E. Hale, of Cleveland.

Several New Companies

Several other new companies are forming, but the details of these are not yet available. Among these are the Bailey Motor Car Co., to build delivery wagons and light trucks; the Johnson Roller Bearing Co., to make a new and different type of roller bearing; the Reynolds Motor Co., to build a new engine with rotary valves and other features; the Hastings Motor Car Co., to build a six-cylinder pleasure car with rotary valves; a new motor car bank; and several agency and selling companies.

It was announced that the W. A. Paterson Automobile Co., of Flint, Mich., an old established carriage firm which has just entered the motor car business and is building the Paterson 30, would establish in Windsor, Ont. This firm wanted to move into Detroit, but could not find an available site or a factory which would answer. The decision then was made to stay at Flint, while a Canadian branch factory was established across the river. This decision was made following the acceptance by the city of Windsor of the agreement with the Electrical Distributing Co., Ltd., for the importation of Niagara Falls power. The Ferriss livery stable, at Pitt and Ferry streets, has been leased and work of remodeling it started. The front will be made into a salesroom, while the rear part and upper floors will be used for assembling the cars, under the supervision of T. G. Ferriss, who becomes sales manager for Canada.

The past week also saw the tripling of the capitalization of three of the General Motors component companies in this state, these being: the Marquette Motor Co., Saginaw, from $300,000 to $800,000; the Oakland Motor Car Co., Pontiac, from $200,000 to $800,000; and the Cartercar Co., Pontiac, from $350,000 to $650,000. The total was $850,000 and the changes raise this to $2,250,000. This company gained a signal victory in Detroit when Judge Donavan ruled that Albert E. French must carry out his contract and sell his land to the General Motors Co. The company bought, through an agent, four lots which formed an important part of the land for the proposed mammoth plant in the northeastern part of the city. The real estate dealer who put the deal through paid French $100 on account of the agreed purchase price of $4,800. Later, before the deal could be closed, French learned for whom the land was bought and held out for a higher price, refusing to sell at the previously agreed upon figure. This matter has held up the entire enterprise, which was taken into account by Judge Donavan, who said that the sum offered was all that French could equitably claim and that all that held him from selling was his anger.

By the terms of an agreement just closed, River Rouge gains another plant devoted to the manufacture of motor car parts, a company in Elyria having decided to move here. No land could be found within the city limits, so the property at River Rouge was obtained. A large and modern factory will be erected, and a force of at least 100 men started to work in the fall. Another company, formed some time ago, the True Blue Motor Co., is again active, the filed articles of incorporation stating that the capital stock is $100,000, while the principal business will be the manufacture of gas and gasoline engines for motor car and marine use. The stock is held by Maurice Wolf, 2,842 shares; Wallace E. Brown, 1,658 shares, and Edmund H. Coombs, 500 shares.

Many New Buildings

For this season of the year, there is an unusual amount of building now going on. At the Anderson Carriage Co. works the makers of the Detroit electric are building a new structure to house the new truck end of the business, into which they are going to embark on a larger scale. This building is 314 feet long by 80 feet wide, three stories high, but with a high basement, giving practically four stories with a total floor space of over 100,000 square feet.

The Regal company is also at work on a large addition, just across Piquette street from the offices. The E-M-F company has just started work on a huge building located on the Woodward avenue side of the present four-story building. The Oliver Motor Car Co. is working on the plans for a four-story structure, to have about 150,000 square feet of space when it is completed.

Reports on Profits and Losses

BRUSSELS, June 4—The year which passed into history on December 31 last was one of the most prosperous which the European manufacturers of motor car parts and accessories have experienced. Out of sixty-three concerns whose annual statements are obtainable, only three show a loss, while in 1908, out of sixty-eight concerns whose profit and loss account was looked over, fifteen had met with losses.

The tire and rubber goods manufacturers made more money than car makers. The biggest dividend known to be paid by a manufacturer of motor cars is 25 per cent —that paid by the Adler company of Germany. The Dunlop Tire Co., of England, is credited with having paid 100 per cent dividend not only last year but in each of the preceding 2 years; the Continental company, of Germany, has been paying 40 per cent for the last 3 years and the Peters Union, also of Germany, 25 per cent.

It is difficult if not impossible to obtain an accurate and exact idea of the tire business of any concern which makes other goods besides these. The Adler company in addition to motor cars, makes motor cycles, bicycles, sewing machines and typewriters. Half a dozen other German houses make bicycles, motor cycles and motor cars. In Belgium, the Fabrique Nationale which makes the F. N. cars, also manufactures bicycles, motor cycles, guns and other war material. In France the Lorraine-Dietrich has for many years been known as one of the biggest concerns making railroad and street car material. De Dion-Bouton recently added bicycles to it's production.

Doubt Cast on Some Figures

In some instances it also is doubtful if the figures given by the interested parties were not arranged so as to show a profit when in reality there was a loss. Such instances probably are very few but they exist and the writer makes this statement from the things he heard regarding one Belgian concern and a French company. In Germany the conditions seem to be by far the most satisfactory. The records obtainable from the manufacturers, financial publications or bankers show that not one of the seventeen concerns whose statements are given met with a business loss either in 1909 or in 1908. Seven of the leading concerns—the Adler, Durkopp, Daimler, Horch, Eisenach-Dixi, Stoewer and Benz—are credited with a total profit of $1,135,406, while for the year 1908 these same concerns together only made a profit of $797,659 or $337,747 more than in 1909. The five leading tire manufacturing concerns—Continental, Peters Union, German Dunlop, Calmon and Metzler—cleared together a total of $1,816,118 or $502,853 more than in 1908.

No other concern in Germany has been as successfully conducted as the Adler. Since 1904 the net profits total $2,092,021 or an average of $348,670 for the last 6 years. It is the motor end of the business which is specially profitable. The concern which employes from 2,500 to 3,000 men will enlarge it's plant as it is not in a position to meet the increasing demand.

Among the concerns making tires the Continental easily maintains its leading position. Organized in 1871 it was a profit-making undertaking from the start. In 1886 the 25 per cent dividend mark was passed, the stockholders getting 27 per cent. So it was annually till 1903 when 30 per cent was distributed. In 1904 the dividend was 40 per cent, in 1905 it was 50 per cent and then during 3 years 55 per cent, which was the highest mark. During the last few years only 40 per cent dividend was declared, but at that it was 15 per cent more than any other German tire manufacturer paid.

Report From Benz Company

The business year of the Benz company has not been in any way as bad as the profit and loss account for last year would indicate in comparision with 1908. Benz recently purchased the plant and assets of another motor car concern which involved the expenditure of several millions and made it necessary to increase the capital. Benz & Co., at the end of last year employed 1,850 men and are now said to have over 2,000. The Rheinischen Automobil Gesellschaft, Benz & Co., was organized for the purpose of handling the output of the Benz company, otherwise known at the Rheinische Gasmotoren Gesellschaft.

At the present time there are over 7,000 men employed by the Continental Caoutchouc and Gutta Percha Co., in Hanover. At the end of 1908 there were 6,144 workers in the plant and at the end of 1909, 6,855. The company started with a capital stock of $225,000 in 1871, which recently was increased for the third time it now being $2,250,000. The stock of the company has increased 500 per cent. The German records are:

Concern	Capital	Profit or Loss 1909
Durkopp 1889	$ 750,000	$ 219,221 P 23%
Daimler 1890	1,222,250	190,390 P 8%
Adler 1895	1,250,000	529,276 P 25%
A. Horch 1904	250,000	49,450 P 12%
German Dunlop.... 1907	750,000	74,809 P 4%
Wanderer 1896	400,000	139,490 P 20%
Eisenach-Dixi 1896	750,000	37,062 P 4%
Peters Union tire...	1,250,000	404,122 P 25%
Metzeler tire..... 1901	600,000	139,671 P 6%
Continental tire.... 1871	1,800,000	1,118,165 P 40%
Neckarsulmer 1884	450,000	47,837 P 6%
Stoewer 1858	625,000	74,580 P 10%
Presto 1906	275,000	29,498 P 7%
Rheinische A. G. Benz	500,000	35,427 P 7%
Rheinischen Gas Benz & Co..... 1899	2,000,000	14,082 P 0%
German Michelin .. 1906	100,000	4,400 P 0%
Calmon tire..... 1896	1,500,000	79,371 P 6%

P—profit

In France among twelve concerns whose annual statement was obtainable only one is credited with a loss. It is the old Lorraine-Dietrich house and in 1909 its losses are recorded at $2,119,906. During the previous 4 years—1905 to 1908—this concern made a total profit of $1,446,910. The Lorraine-Dietrich concern has been mainly interested in the construction of railroad material such as freight cars and passenger coaches, but losses are due almost entirely to the motor car branch and it is claimed that if the company had followed the advice of some of its directors the situation would not have happened. The old policy of making only expensive cars was adhered to and thus it was that for 2 years the company practically did no business at all as there hardly was any demand for the high-priced cars with which the plant was stocked. A reorganization has taken place, the original stocks, worth when issued $100 a share, having been reduced to $25. A new issue has been made in order to put the capital again up to the original amount of $3,000,000. The Peugeot Freres concern which recently took in the Les Fils de Peugeot Freres—which has been making the well known Lion-Peugeot voiturettes—has had the most successful year of all French concerns, excepting the de Dion-Bouton.

Many of the French concerns are only located in France the stockholders and the directors being nearly all Englishmen. Such is the case of the Delahaye Charron, Chenard & Walcker and Darracq companies.

Five of the most important concerns making motor cars—Peugeot, de Dion-Bouton, Chenard & Walcker, Brasier, and Vinot-Deguignand—made together in 1909 a profit of $625,113 as against $432,994 in 1908, while two tire manufacturers—Hutchinson anl Le Gaulois—who cleared $615,089 in 1908 made $1,101,374 last year. The French Dunlop Tire Co., which lost close to $60,000 in 1908 is credited with a net profit of over $390,000 in 1909.

Business Done in France

To have an idea of the business transacted by some of the French companies here is the record for the Brasier, which was organized in 1899. The amount of business for the year 1899-1900 amounted to $344,972; in 1901, $529,733; in 1902, $717,777; in 1903, $886,862; in 1904, $1,084,155; in 1905, $1,476,723; in 1906, $1,507,925; in 1907, $1,303,409; in 1908, $976,978, and in 1909, $1,026,145. In 1908 only 375 Brasier chassis were sold, the average price being $2,605; while in 1909, 628 chassis were sold but their average valne was only $1,634.

In the statement of the Vinot-Deguignand concern for 1909 it was announced to the stock holders that the business secured for the first 3 months of 1910 totaled as much as the entire amount of business transacted in 1909.

From the European Motor Marts

No information could be secured concerning the Renault. It is known, however, that the original capital of the original Renault Brothers and which was but of a small size never has been raised. It is the most prosperous concern in the motor car business in France and is said to employ about 4,000 men at the present time.

The standing of Panhard & Levassor also is kept secret. The stock of the company which is capitalized at $100,000 is not on the market. It is known that last year the concern did better than during the previous 2 years. The old Mors, which had known prosperity for many years sustained heavy losses in recent years. In 1900 the year ended with a profit of $83,266; in 1901 it reached $123,845; in 1902, $244,719; in 1903, $123,275; in 1904, $105,482. From then on things did not turn out as well. There was a loss of $106,820 in 1905 followed by a betterment, there being a profit of $45,630 in 1906. In 1907-1908 there was a loss of $126,800. Last year the company transacted business to the amount of $777,062 or $132,668 more than in 1908. There was a gross profit of about $47,000. A reorganization took place, the capital of $800,000 being reduced to $160,000, but with the understanding that it will again be increased.

The French records are:

Name	Capital	Profit or Loss 1909
Peugeot Freres	$1,250,000	$ 217,291 P
Chenard & Walcker	440,000	83,298 P
Bergougnan Le Gaulois tires	1,300,000	444,668 P
Hutchinson tires	1,200,000	266,616 P
Brasier	700,000	27,043 P
Mors	800,000	.....
De Dion-Bouton	3,000,000	240,317 P
Delahaye	1,125,000	.....
French Dunlop tires	500,000	390,090 P
French Mercedes	1,000,000	.....
Nilmelior, part makers	300,000	.....
Aries	200,000	.....
Pilain	300,000	6,351 P
Vinot-Deguignand	160,000	57,164 P
Decauville aine	1,000,000	.....
Rochet-Schneider	500,000	36,351 P
Brouhot	350,000	.....
De la Buire	800,000	.....
Lorraine-Dietrich	3,000,000	2,119,906 L
Mestre & Blatge, parts	500,000	122,000 P

P—profit L—loss

Improved Year for English

The business in Great Britain was better in 1909 than in 1908 yet it was by no means as good, in a general way, as that of the German and French manufacturers. The British Darracq company which did so splendidly in 1907 and 1908 permitting the distribution of 20 per cent dividends, saw its profits drop nearly $300,000 for the year 1909. There remained, however, a fair bonus on the good side of the ledger so that the stockholders were given 7½ per cent.

The second big surprise was the one sprung by the British Daimler people. The year before they closed their accounts with a loss of nearly $250,000 as compared with over $550,000 clear profit in 1907. In 1909 the balance showed up a profit not very far from the $100,000 mark. It is due, so it is said, to the Knight motor with which the British concern is fitting its cars. The Dunlop Tire Co., of Great Britain keeps up its wonderful growing capacity. Nearly $100,000 more profits were made the past year than in 1908. Several concerns like the Argylls are being set back on their feet and expected to recuperate from their recent bad years. The ledger shows:

Concern	Capital	Profit or Loss 1909
A. Darracq & Co	$3,250,000	$ 431,835 P 7.5%
Rolls-Royce	.....	99,965 P
English Daimler	2,500,000	94,445 P
Humber	500,000	.....
Rover	1,000,000	46,105 L
De Dion-Bouton	975,000	41,410 P
Swift	1,000,000	.....
Deasy	750,000	.....
Sunbeam	300,000	450 P
Rudge-Whitworth	1,000,000	8,665 P
S. F. Edge	1,375,000	.....
Fiat Motor Cab	.....	46,985 P
Belize	.....	66,440 P 6%
Thornycroft	1,750,000	69,200 P
Star	600,000	92,015 P
Clement-Talbot	.....	113,105 P 10%
Stepney Sparewheel	600,000	165,215 P 20%
Argylls	2,500,000	8,150 P
Alldays & Onions	.....	45,335 P 10%
B. S. A	5,000,000	420,430 P 15%
Enfield	625,000	62,290 P
Triumph	650,000	134,410 P
J. B. Brooks	1,000,000	86,610 P
Joseph Lucas	1,125,000	117,740 P
Premier	875,000	67,300 P
Dunlop Tire	10,575,000	1,604,290 P 100%

P—profit L—loss

What Belgium Has Done

The Belgian motor car manufactures did very well in 1909. Eight concerns with a total capitalization of $3,095,000 cleared together a profit of $564,122 or $116,949 more than in 1908. Considering the ever increasing importation of foreign-made motor cars, especially French machines, it is astonishing that the Belgian industry is as flourishing.

Several of the concerns hardly sell a car in Belgium. They dispose of the entire output to some British syndicate or motor car agent who in turn disposes of the cars in other countries. Were it not for this method it is likely that more than half of the Belgian car makers would suffer losses as the Belgian people, especially the wealthy, the nobility, seems to prefer by far the better known foreign-made cars. Otherwise it would not be possible for so many Renault, Peugeots, Panhard, Fiat, Mercedes, etc., to be sold.

The Belgian car which is at present most popular is without doubt the Minerva-Knight. Since this old Belgium concern adopted the American motor there has been no way for it to turn out cars fast enough. The output for the current year has been disposed of long ago and every thing seems to indicate that the demand will not soon let up. In favor of the Minerva house it must be said that it is one of the few concerns here which is well managed. There are several other makers whose cars are good ones but where clever management is lacking. It often is heard in financial circles that money is being squandered by several firms but as the men behind them, those who pay the bills are very wealthy, nothing more is either said or done about it. The Belgian report is as follows:

Concern	Capital	Profit or Loss 1909
Minerva	$ 650,000	$ 111,866 P
Royal Star	60,000	7,955 P
Vivinius	200,000	10,401 L
Germain	400,000	56,122 L
F. N.	1,320,000	320,000 P
Pipe	300,000	35,165 P
Springuel	100,000	11,271 P gross
L'Auto-Mixte	100,000	.....
Metallurgique	65,000	21,743 P

P—profit L—loss

For the first time in 3 years the manufacturers of the Fiat cars pulled through the business year in making a handsome profit. The net profit for 1909 is said to be $380,000, and made it possible to distribute 6 per cent dividend. In 1908 there was a loss of over $61,000 while in 1907 the loss of the best known of Italy's motor car manufacturing concerns was but a few dollars shy of the $1,500,000 mark. And this after the concern had been paying 30 or 40 per cent dividends for the previous business year. The shares of the Fiat company which at first were quoted at $40 quickly rose to $100, then $200, $300 and even $400. Then the crash came and the stock fell as fast as it had gone up, being offered for a couple of dollars. After the reorganization of the company, things took a better aspect and now it is said that the firm is again on very good standing. Last year the Fiat concern disposed of 1,900 Fiat chassis and it is said that a large proportion of them went to the United States. At any rate the report has gone around that were it not for the United States customers the Fiat company would not have been realizing a profit in 1909. The report is:

Concern	Capital	Profit or Loss 1909
Fiat	$2,400,000	$ 380,000 P 6%
1899 Bianchi	400,000	.....
1885 Frejus-Diatto	230,000	.....
1905 Isotta-Fraschini	800,000	.....
Itala	600,000	.....
1904 S. P. A.	900,000	.....
1906 S. C. A. T.	140,000	.....
1906 San Giorgio —profit	450,000	.....

Report from Austria

The most important motor car manufacturing concern in Austria is that of Laurin & Klement which this year is building 500 cars and 1,000 motor cycles. There are about 900 men in the plants and the business of the company has been steadily increasing. Johann Puch who has been known for many years as the builder of the Puch motor cycles has also been doing well as a motor car builder. The report:

Concern	Capital	Profit or Loss 1909
Harburg tire	$1,500,000	$ 135,304 P 6%
Graft & Stiff	205,000	20,019 P 8%
1907 Austrian Fiat	256,250	.....
1907 Puch	307,500	.....
1906 Laurin-Klement	615,000	54,395 P 6%
1907		

The Readers'

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

MENDING CRACKED JACKET

OTTAWA, Kan.—Editor Motor Age—One of the water jackets on my motor has a crack in it on the outside. I have tried iron filler and still it leaks.

Have tried soldering it but the solder does not stick to the casting. Will Motor Age inform me how to fill up this crack, or how to make the solder stick.—Wm. A. Cramer.

Motor Age suggests that you try rusting the cylinder with sal ammoniac. Take ½-pound of pulverized sal ammoniac; mix it with ½-gallon of water and boil. Pour this into the cylinder and let it stand over night. Drain this out on the following morning and allow the jacket to stand idle for a day, during which time the rusting to fill the crack should take place. Plain ammonia has been used, but not with so great success. When used a pint of pure ammonia is mixed with a pint of water, or double quantities if desired, and the jacket filled. It should be allowed to stand for a couple of days at least, when the jacket is drained and an opportunity left for the rusting to take place. In case these suggestions do not prove successful, it would be most practical to send it to some reputable autogenous welding concern and have the crack closed in this manner.

BOOK ON MOTOR TECHNIQUE

Minneapolis, Minn.—Editor Motor Age—Kindly inform me what is the best book for a scholar fully describing the motor car, and where I can secure same.—E. J. L.

It is difficult to give you the above information without being thoroughly familiar with your requirements. There are a number of good books on the market and Motor Age would refer you to its advertising columns. "Brooke's Automobile Handbook," published by Frederick J. Drake and Co., Chicago, is a work of practical information for the use of owners, operators and motor mechanics giving information on almost all questions relating to the construction, care and operation of gasoline and electric motor cars and might be considered quite practical for the beginner or student. "Self Propelled Vehicles," by J. E. Homans is more elaborate and consists of a practical illustrated treatise on motor cars published by Audel & Co., New York. It goes more into detail in all features such as theory, construction, operation, care and management of all forms of motor cars. Either of these books may be obtained from the Class Journal Co., 1200 Michigan avenue, Chicago.

HAS A SLIPPING CLUTCH

Aurora, Ill.—Editor Motor Age—Will Motor Age kindly tell me a way to prevent the clutch slipping on a 1909 Hupmobile? It is fitted with the cone type of clutch and communicates directly with the transmission case, and the outer rim of the clutch becomes constantly covered with grease. Would it help if a hole were drilled through the front of the clutch casing to the opening between the cones through which gasoline could be forced to clean it and clutch compound applied? —D. A. Nobles.

The clutch of the Hupmobile cars is designed to run in oil, and if the adjustments and the fiber thereon are as they should be the clutch should not slip. It is quite possible that the fiber clutch lining on your car is worn out so that the clutch bottoms in the flywheel. This will require the removal of the clutch and relining with new fiber. To remove the clutch it would be necessary to remove the motor from the car. When removed the clutch may be sent to the Chicago agency where it will be properly relined at a nominal cost, or if you desire to reline it yourself, new fiber linings may be obtained from the Chicago agency.

SUFFER FROM SPEED TRAPS

Sycamore, O.—Editor Motor Age—Several parties have been arrested here this week for exceeding the speed limit of 8 miles per hour, including one horse-drawn vehicle, one motor cycle, and the remainder out-of-town motorists. No signboards have been erected to warn parties entering the town of the danger they will encounter. Motorists living in Sycamore do not approve of the steps taken by the city fathers in the matter, and undoubtedly we will meet with similar treatment when motoring in their home town. What we want is a change in the laws to make arrests for reckless driving.—J. W. Hardinger.

The immediate solution is erecting warning signboards at the corporation limits, calling attention to the speed laws.

MAKING FRICTION WINDSHIELDS

Newbury, N. H.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly give the names and addresses of several agents for friction windshields of different type.

2—What is the best method of removing carbon from cylinders of a double opposed motor?

3—What is the price of volume 2, Automobile Blue Book, and where can same be purchased?—Subscriber.

1—The following firms manufacture friction windshields and the address of the various agents may be obtained from them. Victor Auto Supply Mfg. Co., 42 West Forty-third street, New York; Sprague Umbrella Co., Norwalk, O.; Newark Rivet Works, 262 Lafayette street, Newark; N. J., E. M. Benford Mfg. Co., Mt. Vernon, N. Y. Three different types of friction windshields are also handled by the United Manufacturers Co., 250 West Fifty-fourth street, New York.

2—In the Readers' Clearing House columns of Motor Age issue of April 21, page 23, under the head of "Overhauling a Maxwell," a very successful method of removing carbon from cylinders of a double-opposed motor was given, describing each operation in detail. If the carbon has not become baked onto the walls and piston heads of the motor it may be very satisfactorily removed by some good carbon removing compound, obtainable from almost any motor car supply house.

3—The price of the Automobile Blue Book is $2.50 per volume, and it may be obtained from Rand, McNally & Co., A. C. McClurg & Co., the Automobile Blue Book Publishing Co., 1200 Michigan avenue—all of Chicago—or from almost any motor car supply house.

ASKS ABOUT COMMERCIALS

San Francisco, Calif.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, answer the following questions:

1—Is the demand for the commercial vehicle on the increase? If so, is the increase rapid or gradual?

2—Which is the most satisfactory or most in demand on light commercial vehicles, the solid or pneumatic tires?

3—Is it true that the fear of tire expense is holding this branch of the business back to some extent?

4—Is it probable that this branch of the business is likely in the near future to be as great, if not greater, than that of the pleasure car?

5—Is the manufacture of the six-cylinder machine on the increase?

6—Are there sufficient advantages in the six over the four-cylinder car to make the six a much more desirable machine?

7—Would the demand for the six be likely to increase to any great extent if the selling price was more reasonable; in other words, is the high price of this style of machine keeping it from being as popular as it would otherwise be?—Jess E. Hill.

1—The demand for commercial vehicles is steadily on the increase, and several of our most reputable builders of pleasure cars are now marketing commercial vehicles of different load capacities. The increase is rapid at the present time.

2—This is answered in No. 1.

3—The solid tire is more popular for light commercial vehicles.

4—The matter of expense is not holding the commercial vehicle back. The advent

Clearing House

EDITORS' NOTE—To the Readers of the Clearing House columns: Motor Age insists on having bona fide signatures to all communications published in this department. It has been discovered that the proper signature has not been given on many communications, and Motor Age will not publish such communications, and will take steps to hunt down the offenders of this rule if it is violated

of the commercial vehicle has been slow because all of our manufacturers have had all they could do manufacturing pleasure vehicles, and it would be unnatural to expect them to surrender so fruitful a field in order to experiment with commercial cars.

5—Within a few years the commercial vehicle business will be on a par with the manufacture of pleasure cars. It is questionable if it will be greater at that time. The advent of the commercial vehicle in America will not be as rapid as it has been in Europe because Europe has better roads and there is greater economy there in using the commercial car.

6—The output of six-cylinder machines is increasing over each succeeding season. The relative output of six-cylinder cars as compared with four-cylinder machines is not increasing.

7—The continuous torque in six-cylinder cars gives this type an advantage over the four. Because of this continuous torque the wear on the bearings and other parts of a six-cylinder car is not so great as in a four.

8—There is no doubt but that the demand for six-cylinder cars will increase, particularly in the high-priced field.

CLEANING DIRTY HANDS

Great Falls, Mont.—Editor Motor Age—Through the Readers' Clearing House I would be pleased to learn of something that can be applied to the hands before beginning work on a car that will prevent the black grease and oil from staining them. An hour's work on a dirty motor will so soil the hands that soap will only partially remove the stain. Some time ago I saw an article on this subject in the Readers' Clearing House, but am unable to locate it at the present time.—Subscriber.

If before tackling a specially dirty job the crevices of the skin were filled with a good toilet soap there would be little trouble in removing the dirt when the job is finished, and the skin would remain soft and smooth. A coarse, hard skin is much harder to keep clean than a smooth, fine one, and the use of strong alkaline soaps and gasoline tend to make the skin rough and scaly. For cleaning their hands most repairmen use soft soap and gasoline because it can be obtained free of charge, a strong argument in its favor, but a handful of sawdust saturated with kerosene will be found just as cheap, more effective and less detrimental to the cuticle. In operations where acid is used, such as in soldering with zinc chloride as a flux, it is advisable to wear gloves, the soft cotton kind, which may be purchased for 5 or 10 cents in almost any dry goods or furnishings store being most practicable. If this precaution is not taken the next best thing is to wash the hands in clean warm water, without soap, directly after the operation; then rub the hands, and especially the finger-tips, with vaseline. This is to prevent the painful cracking of the skin due to the action of the acid, which otherwise is very difficult to avoid.

IS ONE-PIECE CONSTRUCTION

Sheyenne, N. D.—Editor Motor Age—Will Motor Age, through the Readers' Clearing House, answer the following questions: How is the planetary transmission shaft made on a 5¼ by 5 two-cylinder Jackson motor car? Is the flange that is bolted on the flywheel shrunk on or is the flange and shaft made of one piece of iron?—Arnie Cliffgard.

The planetary transmission shaft above referred to is of one-piece construction.

EMERGENCY SECTIONAL TIRE

Baltimore, Md.—Editor Motor Age—In Motor Age, issue May 19, page 19, A. E. Lawrence, Decatur, Mich., speaks of an emergency sectional tire, which bolts on the rim, and which Motor Age has not seen. I expect that the tire to which Mr. Lawrence refers is the patent emergency sectional tire, made by the Auto Emergency Tire and Mfg. Co., Baltimore, which was brought out at the Baltimore show, and as far as the writer can judge has given entire satisfaction, as one often sees them in use on our streets.—C. Ridgely Emory.

ENGINE TYPES DEFINED

Chicago—Editor Motor Age—Will Motor Age kindly answer the following questions through the Readers' Clearing House:

1—Explain each, also the difference between low and high-compression gasoline motor car engines, and what factors, etc., are taken into consideration in determining in which class an engine should be placed.

2—When travelling in high, but at low speed, why is it easier to kill a six-cylinder motor than a four, as when you strike a short slight incline unexpectedly. Theoretically and practically a six is supposed to perform under such conditions better than a four, is it not?

3—Explain the difference between direct and alternating current, and how each is generated? Could direct current from storage battery be transformed into an alternating current and how? Could the alternating current secured from Bosch magneto be transformed into direct current, and if so, by what means? What bearing would windings on a magneto or dynamo have as to character of current generated?

4—Does a car consume more gasoline per mile when running in second or third gear than it would on fourth or high? If so, why?

5—Please refer to the answer to the communication of Mr. Dunbar, of Wabash, Ind., issue of May 5, which explains why too rich a mixture causes loss of power; also why any excessive amount of air causes back-firing and popping in the carbureter.

6—With what could the binding posts of Fulmen battery be treated to prevent corrosion? I have tried acid paint, but without success.—E. S. V.

1—The ordinary compression pressure in motor car engines is generally between 70 and 80 pounds to the square inch. This is considered the range of medium compression. Pressures above this might be termed high compression, and anything below, low compression. For engines which are intended to run particuarly slow, so that the car can be driven as slowly as possible without changing gear, lower compressions down to 60 pounds to the square inch and even lower are used. When fuel economy is being carefully studied, however, much higher compressions are used, namely, up to 100 pounds to the square inch. Such pressures are used, for example, in economy tests. The factors to be considered in determining whether an engine is of a high or low compression type are the ratio of compression and the percentage of the clearance volume as compared with the total cylinder volume. According to Hiscox, it has been shown that an ideal efficiency of 33 per cent for 38 pounds compression will increase to 40 per cent for 66 pounds, and 43 per cent for 88 pounds compression. On the other hand, greater compression means greater explosive pressure and greater strain on the engine structure, which in present practice retains the compression comparatively low.

2—Under normal conditions, both theoretically and practically, a six-cylinder motor is not as easy to kill under the conditions mentioned as a four-cylinder motor; and if your experience has been to the contrary, it is most likely that either your carbureter was out of adjustment or you were running on the magneto and it was not turning fast enough to develop a sufficiently hot spark to bring about efficient or timely explosions.

3—An electric circuit carries direct current when electricity passes in one direction continuosly through the circuit; and a circuit carries alternating current when at one moment electricity passes in one direction throughout the whole circuit, and at a later instant of time in the opposite direction throughout the whole circuit, and so on. Motor Age knows of no

method of transforming a direct current from a storage battery into alternating current, except through a motor and dynamo or converter. Yes. The alternating current from a Bosch magneto could be transformed into a direct current by means of a mercury arc rectifier. The larger the diameter of the wire used upon an armature, the greater its capacity; and the more turns, the greater the voltage.

4. Yes. A car will consume more gasoline per mile when running on second or third gear than it would on fourth or high. If, for instance, a car was geared three to one on the high speed gear, the motor would make three revolutions for every revolution of the wheels; the wheels always will make a certain number of revolutions per mile; and a motor always takes in a certain amount of fuel per revolution. Now, if on the third speed the gear ratio of the engine was six to one, the engine would have to turn over six times for every revolution of the wheels; this means that it would take in twice as much gas as when running on high, and if on second speed the car was geared nine to one, three times as much gas would be used, etc.

5—An over rich mixture causes a loss of power by overheating the motor; and an over rich mixture is a slow-burning mixture which does not ignite quickly; therefore ignition of the charge does not take place until the piston is comparatively far down on its explosion stroke. Thus, instead of the most intense heat coming in contact only with the combustion chamber of the motor, it also is brought into contact with the lubricated cylinder walls for a considerable length of time, so the lubricant is burned off soon and the overheating enhanced by heat which is generated from the resulting friction. As soon as the overheating becomes excessive, preignition often takes place, the pistons expand, and if this condition is ignored the motor is apt to come to rather a sudden stop on account of the pistons having become stuck in the cylinders. When the intake pipe of a motor is designed it must be of a certain size so that the mixture of gasoline and air therein will not be of such proportions as to be combustible while in the intake pipe. When the fuel in the intake pipe is too rich in air it becomes combustible while therein, so that as soon as the intake valve is opened, with the motor travelling at a high rate of speed, the combustible charge in the intake pipe is ignited by the flames of the previous charge which still remain in the cylinder, and back firing in the carbureter takes place. Back firing would take place in the same way if too large an intake pipe were fitted to a motor.

6—It is recommended that vaseline smeared on the terminals of a storage battery will prevent corrosion.

MANY QUESTIONS ASKED

Paducah, Ky.—Editor Motor Age—I am a reader of Motor Age and desire to ask the following questions:

1—What is the weight and highest speed of the Buick model 10, also the Ford model T?

2—What is the A. L. A. M. rating of Oldfield's 200-horsepower Benz?

3—Will Motor Age give me the name of a good polish for cleaning tops and bodies?

4—I have a Kingston coil on my car, and of late it has to be adjusted every day. What is the trouble with it?

5—Why is it that the valves carbonize quicker than the pistons?

6—How can I clean out a Ford model T crankcase?

7—Has the Glidden route been decided upon?

8—What is the average life of a motor car?—A. R. Jones.

1—According to advices from the local agents of the above mentioned cars, the Buick weighs 1,800 pounds and its highest speed is 60 miles per hour. The weight of the Ford model T is 1,500 pounds, and it is claimed that while racing an ice boat on Lake St. Clair last winter the model T Ford, geared up for the occasion, covered a distance of 1¼ miles in 59⅗ seconds.

2—The A. L. A. M. rating of Oldfield's 200-horsepower Benz is approximately 84.7 horsepower.

3—The Frank Miller Co., New York, manufactures a harness dressing which is recommended for use on motor car tops, and a good body polish can be obtained from almost any motor car supply house.

4—Your trouble apparently is due to the fact that your batteries are weak. It would be well to have them tested. It might also be well to examine the platinum contact points and see that they are not pitted. Test the batteries while the coil is in operation.

5—It is not characteristic of all motors that the valves carbonize quicker than the cylinder heads, and it is more likely that this is simply a peculiarity of your own motor or those which have come under your own observation, and is due either to an excessive supply of oil to the cylinder, which, on account of the design, accumulates on the valve. An over-rich mixture might also cause an accumulation of carbon around the valves quicker than on the pistons.

6—To clean out a Ford model T crankcase remove the plug at the bottom of the case under the flywheel and drain out as much as will run out. Almost the entire contents of the case may be drained if the car is run up on an incline and then the plug removed. To thoroughly clean the case it is then well to replace the plug, introduce about a quart or 2 of carbon remover or kerosene into the crankcase through the breather pipe, run the motor for a few seconds, again remove the plug under the flywheel, drain all the carbon remover or kerosene from the case in the same way as the oil was drained, then replace the plug and replenish the supply in the regular way.

7—Yes. The Glidden route has been decided upon, and in Motor Age issue of May 26, pages 10 and 11, a complete itinerary of this year's tour as laid out by Dai Lewis and which takes in 2,842 miles in thirteen different states is given in detail with the mileage from town to town.

8—It is impossible to give the average life of a motor car, for there are too many factors entering into an approximation of this sort. If a car is properly designed in the first place and well constructed, carefully driven and properly overhauled from year to year, its life may be prolonged for an indefinite period; some of the first cars made in this country are still on the job with all their crude and complicated design. On the other hand, it is possible to ruin a car just by pure hard service and neglect in a very short time. The life of a car depends on the use it gets. Some cars will be in good condition after 10 years of use and others will be ready to discard before 5 years are gone. The speed at which the car is driven, the roads it travels over, the load it carries, the care with which it is lubricated, the attention given to it by way of adjusting worn bearings, and the regular overhauling of it are all determining factors in the car life. A good car well cared for should last 15 years.

SECURING CHAUFFEUR'S BADGE

Pitcher, N. Y.—Editor Motor Age—Will Motor Age kindly tell me the way in which I can obtain a chauffeur's license? I know how to run several makes of cars but have no license. Is it a good plan to open the spark as far as it will go, and then drive with the throttle? I have noticed several drivers do this and would like to know if this is correct.—R. T. Bennett.

1—Write to the secretary of state, Albany, N. Y., making application for a chauffeur's license. He will send you a regular application blank, on which you will be required to state your name and address and the trade name and motive power of the vehicle or vehicles you are able to operate. You will return this application blank properly filled out, with a registration fee of $2, for which you will receive a chauffeur's badge, which you

will be required to wear in a conspicuous place at all times while operating a motor vehicle on the public highways.

2—In operating a motor car it is not a good plan to advance the spark as far as it will go and then drive with the throttle as you suggest. This only can be done when travelling at a fairly high rate of speed. The spark always should be carried as far advanced as is possible to obtain the highest motor efficiency, that is, it should be advanced as far as possible without causing a knock or vibration. The skilful operator has almost as much use for a spark control lever as for the throttle lever. To maintain the proper equilibrium between the spark and throttle adjustment, both must be changed according to the speed of the motor. If travelling along on a smooth road at a fair rate of speed the spark can be carried comparatively high and requires but little manipulation. But, if in driving on a crowded thoroughfare of a large city where it is necessary to slow down and again accelerate the speed of the car several times in each mile travelled, it is practical to use the spark lever almost as often as the throttle. For instance, in slowing down for a crossing or to avoid another vehicle, the slowing down can be done by simply retarding the throttle lever, but in picking up again the spark lever should be first retarded, the throttle opened, then the spark lever slowly advanced as far as possible to produce the best operation of the motor. Always retard the spark when subjecting the motor to a hard pull and always advance it gradually. Practice, alone, can properly teach the novice how to operate the spark and throttle lever.

CRANKSHAFT SPEED

Kansas City, Mo.—Editor Motor Age—Through the Readers' Clearing House will Motor Age answer the following questions:

1—At about what crankshaft speed does a four-cylinder four-cycle gas engine develop its greatest efficiency?

2—Would not increasing the length of the stroke on the same motor decrease the speed of the crankshaft to develop the same efficiency?

3—At about what ratio would the change in the length of the stroke effect the crankshaft speed?

4—At about what crankshaft speed does a three-cyclinder two-cycle gas engine develop its greatest efficiency?

5—Will Motor Age, at its convenience, publish a complete table on horsepower and speed, showing the horsepower developed at various speeds when driving through the various speeds on a gearset. —P. D. Rouse.

1—The speed at which any motor develops its greatest efficiency, varies greatly with the design of the motor. A long-stroke motor will develop its maximum efficiency at a much lower rate of speed than a short-stroke motor; there are so many factors to be taken into consideration in both types that no close approximation or just average could be obtained.

2—Increasing the length of the stroke on the same motor would decrease the speed of the crankshaft to develop the same efficiency.

3—The ratio of bore to stroke, if the efficiency factor were to remain constant, would vary in direct proportion to the length of the stroke. That is, if a motor of a 4-inch bore and 5-inch stroke would give 40 horsepower, a motor with a 4-inch bore and a 10-inch stroke would give 80 horsepower. This, however, is not the case; the ratio of bore to stroke is one which probably will never become fixed. It is a matter of designers' choice, and too often a designer works simply to turn out what he thinks the public wants rather than what it should have because best.

4—In any two-cycle engine as previously stated, or any four-cycle engine the speed at which it develops its greatest efficiency depends entirely upon the design and construction of the motor and varies accordingly.

5—Motor Age does not comprehend what you mean by a complete table on horsepower and speed showing the horsepower developed at various speeds when driving through the various speeds on the gearset. If you will be more explicit and perhaps indicate the arrangement of the table, the matter you have in mind will receive prompt attention.

USING TELEPHONE GENERATOR

Sauk City, Wis.—Editor Motor Age—Will Motor Age kindly answer the following questions through the Readers' Clearing House?

1—How may I revive a tire which has become hard during the winter?

2—How may I change a telephone generator into a magneto to use with the regular vibrator coils on a motor car, and what size wire must I use on the armature of the device?

3—How much wire will it take to rewind it; must I have a direct or alternating current; must I drive it through a govenor or not.

4—Where can I get repairs for a Pope-Toledo motor car, and what is the present address of the Pope-Toledo motor car factory?—Theo Decot.

1—It is absolutely impossible to revive a tire which has once become hard, but if it is not too hard, reasonably good service may yet be obtained from it if kept well inflated.

2 and 3—Although it might be possible to reconstruct a telephone generator so that its output might be sufficient to supply current for an ignition system it would be very impracticable. In the first place, a telephone generator is designed to supply a current of perhaps 6 volts at a very low amperage, too low in fact for ignition purposes. It is designed to run at the rate of about 60 revolutions per minute for only a few seconds at a time, making in all perhaps a thousand revolutions per week; and if an attempt were made to use it on a motor which at times might exceed the speed of 1,000 revolutions per minute, and not only for minutes but hours at a time it is plain that it would be worn out in a very short time. Magnetos for ignition purposes to be successful must be made of the finest materials most accurately -machined and assembled; the telephone generator would be a continuous source of trouble.

4—Repairs for a Pope-Toledo motor car may be obtained from the Auto-Salvage Parts Co., 1436 Wabash avenue, Chicago, or direct from the Overland factory, Toledo, O.

MAGNETOS AND LIGHTING

Eldora, Ia.—Editor Motor Age—Will Motor Age through the Readers' Clearing House answer the following questions:

1—Can a Remy magneto—like on the 1910 Overland—be used to furnish current for electric lights in addition to furnishing current for the engine?

2—How can it be arranged?

3—Can the Ford model magneto be used the same way?

4—Is there any danger of destroying the coil by using the magneto for lighting purposes?—C. E. Greef.

1 and 2—A Remy magneto cannot be used to furnish current for electric lights.

3—A magneto as used on the model T Ford is being used for lighting purposes, but Motor Age has been unable to learn the success of the results of its use in this manner.

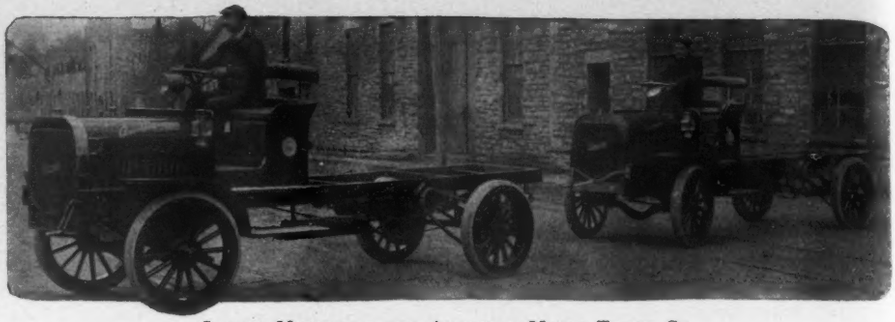
4—There is no danger of destroying a coil by using the magneto for lighting purposes, it is claimed.

Maurice, Ia.—Editor Motor Age—Will you kindly tell me, through the Readers' Clearing House columns, if it is possible and practicable to wire for electric lights from a Splitdorf magneto, how to do it, and if the results are worth while.—E. T. M.

It is impossible without reconstruction of the magneto to wire the Splitdorf apparatus for electric lighting purposes and obtain favorable results.

WHO MAKES STROUD LAMPS?

Polo, Ill.—Editor Motor Age—I have heard of an acetylene lamp called the Stroud, in which the lamp and generator are combined in one apparatus. Can Motor Age give me any information regarding it, where made, and if a success?—J. I. Mason.



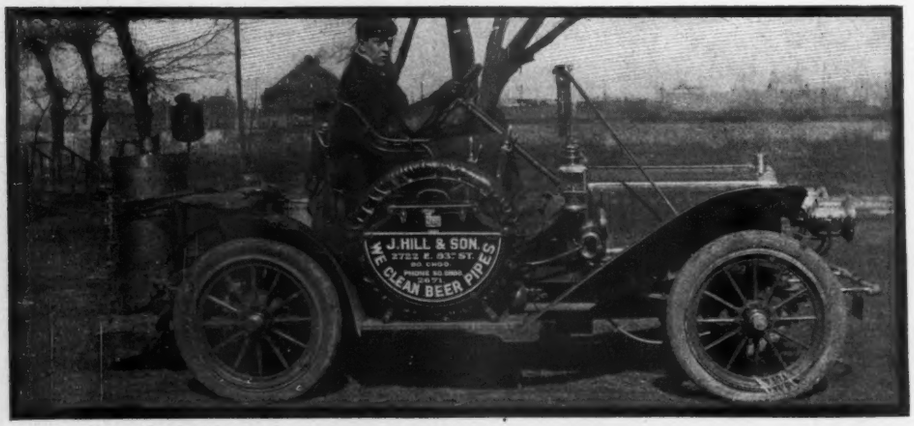
LATEST MODELS OF THE AMERICAN MOTOR TRUCK CO.

In the Realm of the

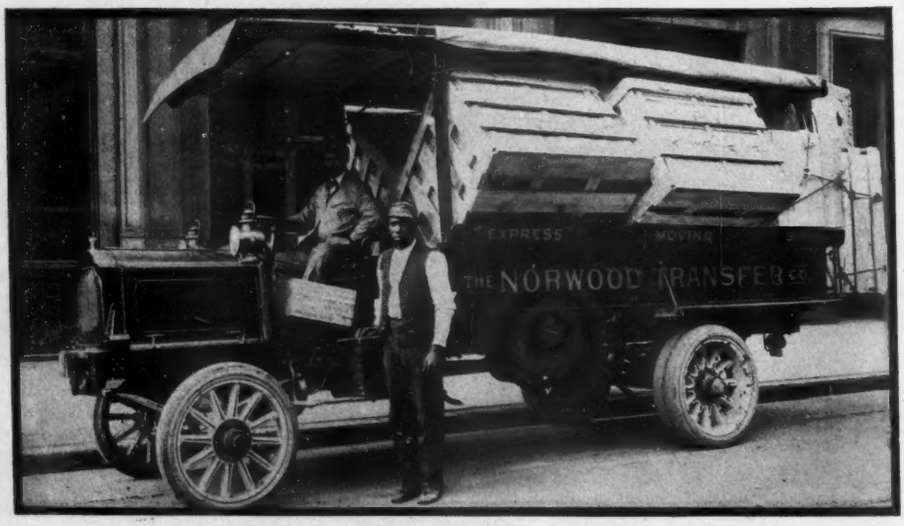
GREAT interest is being displayed just now in the motor truck end of the industry in Detroit, and a number of companies are forming to take up this work. Among those which are now doing business, although of very recent origin, may be mentioned Detroit's latest addition, the Oliver Motor Car Co., which has been incorporated for $300,000, all of which is paid in and available. For the present a building corner of Grand river and Harrison avenue has been obtained, which has about 5,000 square feet of floor space. This is but temporary, however, and will be used only for the construction of the first few model or demonstrating wagons. Plans are being worked upon for a very large factory building, 300 feet long by 60 feet wide, four stories high for a depth of 90 feet, the balance being but two stories high. The whole affords a total of 47,000 feet of floor space. A site for this is under consideration, options on several desirable pieces having been obtained.

The car will be of the light delivery type, at least the first models will, although a 1-ton truck is promised later. This first product will have a carrying capacity of 1,000 pounds, will be powered with a two-cylinder horizontal opposed engine of 4½-inch bore and 4½-inch stroke, a two-speed planetary transmission, made a unit with the engine, the whole forming a unit power plant, which will be removable as a whole without removing anything else. The engine will be set down on a sub-frame, but will not be so low but that a bonnet will be used in front. Semi-elliptic springs will be used both front and rear, while the frame will be of pressed steel of channel section, smooth side out. The wheelbase will be 102 inches, while the tread is standard. Wheels are large, and equipped with solid tires, 38 by ½-inch, both front and rear. Final drive is by shaft. The very large honeycomb radiator is set in front under the bonnet, and is removable with the power plant. For the coming year, a total output of between 300 and 500 is planned. Express bodies will be standard, but any form will be furnished on call.

The officers of the concern are: Lewis Schinnel, president; Paul Wagner, vice-president; Robert S. Hartenseine, treasurer; Frank A. Gies, secretary, and Charles F. Case, general manager.



CHICAGOAN CARRIES AROUND A STEAM BOILER



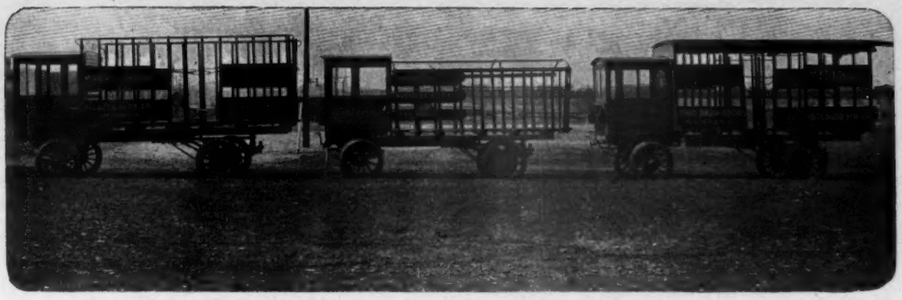
PACKARD USED BY NORWOOD TRANSFER CO. OF NORWOOD, O.

EXIT THE HORSE

Within a short time the city of Indianapolis will be using horses only for drawing its street-sweeping apparatus and heavy hauling, as city officials are rapidly displacing horse-drawn vehicles with motor cars. The board of public works has just purchased three roadsters for the use of the street commissioner, superintendent of street cleaning and superintendent of the municipal asphalt repair plant. This makes about twelve cars owned by the city. Gasoline fire apparatus, a patrol wagon, an ambulance and a car for the building inspector will be purchased soon.

NEW FRENCH SUSPENSION

With rubber at a record price and still rising, inventors of spring suspensions, shock absorbers and other devices intended to abolish the use of pneumatics or to lengthen their natural life, find this the right moment to bring their wares before the public. J. J. Heilmann, a French engineer of considerable repute, has a system which is a radical departure from the standardized method of suspending motor vehicles. He objects to the small wheels used on motor cars in order to obtain a low center of gravity; he considers that the overhanging suspension in relation to the vertical passing through the axis of the wheels and the point of contact with the ground is contrary to engineering principles; and naturally he is of the opinion that pneumatics are out of the question where economy has to be considered on heavy commercial vehicles.



SHIPMENT OF WILCOX TRUCKS ABOUT TO BE SENT OUT

Commercial Car

The principle of the Heilmann suspension can be readily gathered on reference to the illustration. The vehicle is no longer carried from below, but is suspended in the vertical axis of the road wheels, and on their hubs. The axle is entirely free; merely carrying its own weight, serving to unite the two wheels and guiding the chassis and the body in fixed grooves attached to the chassis. As the body is not laid on the springs, but is suspended from above, all swinging of the upper portion is abolished. Although the wheels are almost twice the diameter of those usually employed, the center of gravity is brought down to below the axis of the wheels, and the body is as near to the ground as with the ordinary system of suspension. Further, by the interposition of a universal joint in the axle, each wheel can respond to road inequalities without a twisting of the chassis, or in any way affecting the opposite wheel.

Engineer Heilmann has given a practical application to his system on a Pipe six-cylinder chassis, fitted with a twenty-two-passenger saloon body. Satisfactory experiments have been made, and although some changes will be carried out before construction in series is commenced, these will be of a structural nature only, the principle remaining unchanged. The wheels, as can be seen from the illustrations, are metal ones of very large diameter, with all the suspension in the vertical axis. This consists of two short semielliptic springs, one above and one below the hub of the road wheel, and two hydraulic shock absorbers. By reason of the large diameter of the wheels and the various organs of suspension, all vibration is abolished. The distance that vibrations have to travel from the rim of the road wheel to the chassis is over 14 feet, compared with an average of 50 inches on motor cars with the usual small diameter wheels and semi-elliptic springs.

Neither pneumatic nor solid tires are necessary. The inventor would prefer to use metal bandages; but on account of their side-slipping propensity and the noise they make, he has discarded them for a patented compressed leather bandage. This has no resiliency, but it deadens noise and prevents slip. The external appearance of the suspension suggests considerable additional weight, but according to the inventor, the system is lighter than wooden wheels, solid rubber tires and semi-elliptic springs, as ordinarily used. Complete with twenty-three passengers, the Pipe saloon car with the Heilmann suspension weighs from 1,100 to 1,300 pounds, according to the nature of the passengers. When built in series, very much weight will be saved, for the first model is almost entirely in cast steel, with a very large safety margin. Steel stampings could be used for most of the metal parts, with, of course, a great decrease in weight.

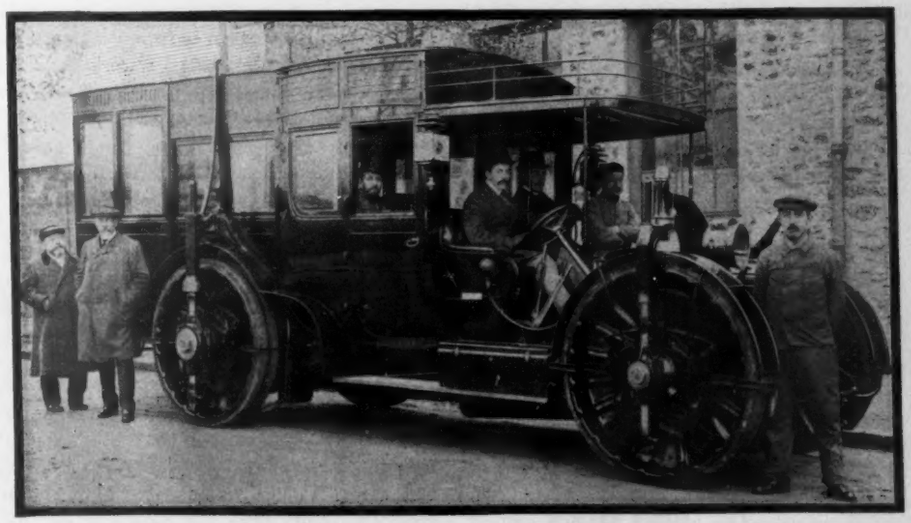
CAR MOVES A POSTOFFICE

When they recently moved the postoffice building in Fall River, Wis., they found a new use for the motor car. By means of a 28-horsepower Franklin touring car the structure, 20 by 32 feet in ground dimensions and containing a safe weighing nearly a ton, was drawn nearly two blocks along the street and set on a new site. All furnishings and equipment remained in the building during the trip. With the car the operation was simple enough. The building was raised, rollers were placed beneath, and the car was attached to it by a tackle. Driven ahead, the motor car moved the postoffice steadily away. Once upon a time the operation would have been done by hand. Ten years ago it probably would have been done by horse power.

NEW IDEA IN CHICAGO

Many are the uses to which the motor is put in the commercial world, but one of the latest ideas has been brought out by J. Hill & Son, of Chicago, who have a Mitchell roadster that carries a steam boiler that is used to clean beer pipes for saloonkeepers.

FRANKLIN CAR MOVES POSTOFFICE AT FALL RIVER, WIS.



HEILMANN SUSPENSION PRINCIPLE APPLIED TO FRENCH MOTOR BUS

From the

MISS SCOTT'S LUGGAGE CARRIER

MISS SCOTT'S IMPROVISED REPAIR

ON Long Demonstration—A Badger car driven by Sales Manager F. W. Stewart is at present engaged in a 3,000-mile demonstrating tour, which started from Chicago and which will take in Colorado, Iowa, Nebraska and Missouri.

Count in Defiance County, O.—There have been returned for taxation in Defiance county, O., 137 motor cars, their valuation having been placed at $37,055. The city of Defiance is credited with thirty-seven, while the little village of Hicksville crows over twenty-five, nearly every resident of the town owning a motor car.

Mount Baldy Entries Few—Unless there is one or more entries in the annual Los Angeles to Mount Baldy road race by August the contest this year over the hundred miles of desert and mountain country will be between Ruess' Pope-Hartford and Shettler's Apperson Jackrabbit. Ruess was winner of the race last year, which places the entrance fee at $1,000, winner take all. To date there has been no other entries and Ruess announces that unless contestants come forward by the date named he will race the Apperson over the course for the fun of it. Ruess feels that Shettler already has shown his sportsmanship in three preceding races, and be believes he should have a chance of racing whether there is a side bet or not.

Busy Erecting Signs—Secretary Forman Wilkinson, of the Automobile Club of Syracuse, Syracuse, N. Y., is busy superintending the erection of route and danger signs in Onondaga and neighboring counties. More than forty were put up during the past week, and the work is only fairly under way. Six hundred signs were erected last year, not only in this county but along favorite adjacent routes popular among motorists, and as far as Richfield Springs. Syracuse signs extended far into the jurisdiction of many other clubs. With this is progressing the gasoline sign movement, and many requests by dwellers in the rural districts for specifications are received at the headquarters of the Syracuse Club. Syracuse was the pioneer in this danger sign movement. Through an accident on Camillus Hill, a few miles from here, 3 years ago, a motorist was killed. Secretary Wilkinson and other officers of the Syracuse club then immediately launched the movement which has resulted in plastering the county with these signs. Mr. Wilkinson paid for the first of these from his own purse.

Too Busy for Outing—So brisk is business in Boston at present that when the Bay State A. A. committee sent out letters asking for replies as to whether it would be possible for enough members to get together for an outing over the holiday this week it was found that so few could spare the time to go away for 3 days that the plan had to be given up.

Winnipeg's Good Example—The Winnipeg Automobile Club has set an excellent example to Canadian municipalities by undertaking to spend the club funds to improve the road from Winnipeg to Portage la Prairie, one of the principal cities of the province, 55 miles distant. It is a popular week-end and afternoon run, and the club will have it accessible by a fine road before the season is far advanced. The club is also spending large sums in improving and assisting with improvements on other important roads leading into Winnipeg.

Nashville on the Job—Nashville's new club has perfected its organization by the election of C. C. Gilbert as a salaried secretary and has completed arrangements for the visit of the Glidden tourists. The Glidden cars will all be parked as they arrive on the public square, arrangements having been made to have them properly guarded. As the first of the cars will not arrive in Nashville until probably 10 p. m. there is no program for that night other than to meet the visitors about 10 miles out from Nashville and escort them to the city. More than 100 cars will go out to meet them. The next morning there is to be a local parade of Nashville cars. All visitors who care to make an early morning trip to the Hermitage, the home of Andrew Jackson, 12 miles out from the city, will be taken out. There is no opportunity for a banquet and the fund that would be used for that purpose has been used in buying handsome souvenirs to be given away.

Columbus' Orphans' Day Plan—The Columbus Automobile Club, of Columbus, O., has asked the Children's Playground Association of Columbus to aid in making the annual orphans' day, to be held June 22, a big success. The committee will ask the club members to donate from 250 to 300 cars for the day. The outing will be held at Big Darby park, 13 miles west of the city. All deserving children, whether orphans or not, will be given an outing.

Mercer Headed for Coast—Latest information concerning the progress of the Mercer car, which is making a transcontinental run, comes from Winslow, Ariz., where the car attracted considerable attention by driving over a tough trail, a feat which no other car has ever accomplished, it is said. At one point C. H. Bigelow, who is driving the car, was caught in a sand storm and was forced to pass the night with the Navajo Indians, going 20 hours with nothing to eat.

Charitable Act—About 100 women of the Friendly Neighbors' Club of Christamore settlement, Indianapolis, were given a motor car outing through the courtesy of the Overland Automobile Co. a few days ago. The club is composed of women in poor circumstances and each summer the settlement workers provide a day's outing for them. This year Will H. Brown, vice-president of the Overland Automobile Co., suggested that he be permitted to furnish the entertainment. He supplied twenty-five touring cars for an afternoon. Many of the women had never ridden in a motor car before.

Realize Need of Good Roads—Representatives of fourteen northern Indiana counties have organized an association which will take steps to have state and national legislation in behalf of good roads in that section of the state. Only recently tradesmen, manufacturers and laboring classes realized that good roads in northern Indiana will be of as much benefit to them as to the farmers, and the organization is the result of the interest taken by the public in general in the good roads convention recently held in South Bend at the Oliver hotel. It was decided to take the matter of good roads legislation up with the nominees to be elected to the legislature this fall and appoint a committee to draft a measure to be presented at the

Four Winds

MISS SCOTT IN TRANSCONTINENTAL OVERLAND AND ITS LUGGAGE-CARRYING CAPACITY

next session of the legislature. Articles of incorporation were adopted by the association, which will be known as the Northern Indiana Good Roads Association. The association is expected to accept the offer of Carl G. Fisher, president of the Indianapolis speedway, who has expressed his willingness to furnish $10,000 worth of crushed stone for the improvement of the highway between South Bend and Plymouth, Ind.

Hartford Counts Profits—The recent 3-day reliability run conducted by the Automobile Club of Hartford, Hartford Conn., proved to be a paying venture and the club comes out ahead of the game. H. P. Maxim, chairman of the contest committee, has reported that the money received for entries was $1,350, while the expense of the run was $1,200, which leaves a small balance. Mr. Maxim has pointed out that every car which started in the run finished the event, there were no ignition troubles and all cars were magneto-equipped. Most trouble was encountered in the clutches of the various penalized cars.

Farmers are Helping—The Southwestern Wisconsin Automobile Association, recently organized by owners in about five counties in the great southwestern Wisconsin lead and zinc mining district, has raised a good-sized sum for road improvement and split-log drags are being used to surface the rough highways. Farmers are learning the value of using the drag and are co-operating with the club to a surprisingly but welcome degree. The association has, almost for the asking, one of the finest road-surfacing materials known. It is a waste product of the mills in the mining district, which has heretofore been piled up in great heaps and neglected, because its value was unknown. Some months ago a delegation of Minnesota legislators came to the district to investigate the material as a road-builder and opened the eyes of the mining men. The material is being used to good advantage by the new club.

Run for Delaware Motorists—The annual run of the Delaware Automobile Association this year will be to Oxford, Pa., next Saturday, and will cover about 82 miles, starting and ending at the court house in Wilmington and going through London Grove, Pa., on the trip out and through West Grove and West Chester, Pa., on the return trip. It will be a sealed time run.

Syracuse Man Offers Trophy—B. E. Watson has offered a trophy for members of the Automobile Club of Syracuse, Syracuse, N. Y., to be competed for only by those in the club roster during 1910, in whatever contest the entertainment committee shall determine. The contest will be annually perpetual until such time as some member wins it three successive times, in which event it will become his personal property. The trophy is a $150 silver loving cup.

Orphans' Day in Buffalo—President Laurens Enos, Secretary Dai H. Lewis and other members of the Automobile Club of Buffalo are delighted with the success of the motor car outing given Thursday, May 9, for the orphans of Buffalo. In the parade were 324 cars, carrying 2,300 children. The weather was perfect and no mishap occurred. Each of the children was supplied with a small American flag and a tag with a card of color and number corresponding to that of the car in which he or she rode. As the parade passed the city hall it was reviewed by Mayor Fuhrmann and other officials. After a tour of the parks, the youngsters were taken to Carnival Court, a local amusement resort, where they enjoyed various attractions and received ice cream and sandwiches.

Omaha Wants Mile Speedway—Dealers of Omaha, Neb., met last week to promote a stock company for the purpose of building a large, oval 1-mile motor track. Ole Hibner was chosen temporary chairman and W. J. Kirkland temporary secretary. A committee was appointed to report upon the best available site. Another committee was named to investigate whether the street railway would extend its line to the proposed track.

Indiana's Fourth Card—Motor car events will be held in a number of Indiana cities on July 4. The first motor car races ever held in southern Indiana will be held on that day at the fair grounds at Petersburg, where business men of the place are arranging an extensive program and providing prizes. Business men of Bloomington will make a trade extension trip in motor cars to Columbus, Nashville, Seymour, French Lick, Mitchell and Bedford, advertising their city. Incidentally the trip will be made an endurance run, prizes to be offered for the cars completing with perfect road and time scores.

Miss Scott's Versatility—Miss Blanche Scott, who passed through Chicago last week on her way from New York to San Francisco in an Overland car, already has demonstrated that it is possible for a woman to tour by herself. While few troubles have been encountered still there was one time when the Overland slipped into a ditch and damaged a rear wheel. While several of the spokes were badly cracked it was possible for the car to be driven 4 miles to a blacksmith's shop, where a temporary repair was made, such as is shown in an accompanying illustration. Miss Scott's Overland also is well equipped for the carrying of luggage, a compartment in the rear being sufficiently large to carry three suitcases.

Enforcing Careful Driving—Following the example of the Automobile Club of Syracuse, which has for the past year inaugurated a vigorous campaign for safe and sane driving in the city and environs, the Cortland Automobile Club, of Cortland, N. Y., has taken action in similar premises. The board of directors sent out letters to the 142 members, asking them to drive cautiously and observe the rules of the road. General observance of the request is reported. The club's president has appointed members to report to the secretary violations of the traffic law, the names of this vigilance committee being withheld. A second violation by the same person is to be reported to the police department. Club members are heartily in favor of this plan, which is more drastic than most tending to this end, which have been reported. It is believed the scheme will be a feasible one.

The Motor Car Repair Shop

THE motor car repairman and driver is often asked for an explanation as to the causes of excessive tire wear and tire trouble. Generally the repairman cannot, and the driver either is ignorant of the reason or he will not tell. The fact of the matter is that one of the greatest causes of poor tire efficiency is inconsiderate driving, and another is improper care; both of which are due to ignorance or carelessness on the part of the driver. In Fig. I two common causes of excessive tire wear are shown. In the upper section of the illustration the car is being driven in the ruts of a country road and grinding down the sides of the tread where the rubber is thinnest, when it might be running on a smoother portion of the road as indicated by the dotted lines. This is a common error. The writer has seen motorists drive for many miles in the ruts of the road when the other course might easily have been followed. Nor is the damage to the tires the only evil of driving in the ruts. The ruts of a country road are rarely straight but generally very tortuous, so that the car is being continually swung from side to side in a manner that severely strains the wheels, their bearings, and the steering mechanism, to say nothing of the discomfort to the passengers. In the lower portion of the illustration is shown the tendency on the part of some drivers to run up so close to the curbstone that the sides of the tires are not only bruised but often the rubber is loosened from the fabric, thus giving birth to the injurious so-called sand-blisters. It is all very well for a driver to bring the car up close so that the occupants may conveniently alight, but it should not be overdone; a few inches clearance as indicated by the dotted outline would be just as convenient for the occupants and would greatly reduce tire costs and troubles.

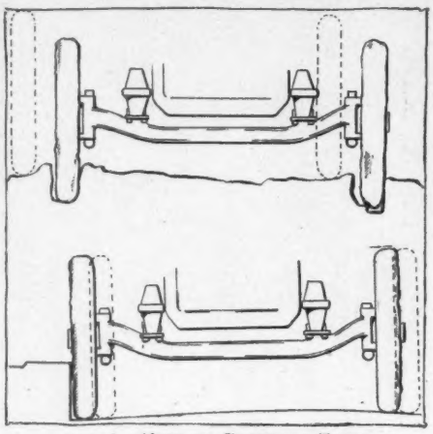


FIG. 1—HOW TO PRESERVE TIRES

Lining Up Front Wheels

Excessive tire wear is often caused by misalignment of the front wheels, and this is a feature that is often ignored or poorly adjusted by the ordinary repairman for the want of proper facilities for making suitable adjustment of these parts. In Fig. 2 an ingenious tool made especially for the purpose of lining up front wheels is shown. This tool is in daily use in the repairshops of the Chicago Coach and Carriage Co. It is made of a piece of angle iron bent in the U shape, mounted on two broad plates and having doubly adjustable ends. To test the alignment of the front wheels of any motor car the tool is placed in front of the axle opposite the foremost part of the felloes of the front wheels, as shown in the upper section of Fig. 2. Thumb nuts T and N, on either end of the tool are then loosened and the verticle sections raised until the horizontal adjustable ends are equal in height to the center of the hubs of the wheels and secured in this position. The horizontal sections S are then extended until they touch the felloes of the wheels and also secured in their respective positions. The whole tool is then carefully removed and similarly placed behind the axle. If the wheels are properly aligned there will be a difference of about ⅜ inch between the measurements taken between the felloes of the wheel in front and behind—that is, the distance between the felloes behind the axle should be about ⅜ of an inch greater than in front. The details of the construction are shown in the lower section of the illustration.

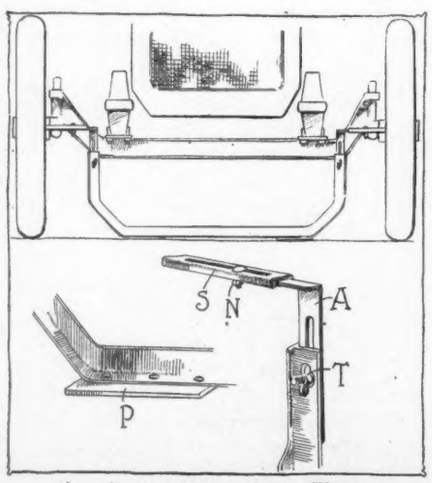


FIG. 2—LINING UP FRONT WHEELS

Starting a Motor

Much difficulty often is met with in starting a motor after it has been standing idle for a long time, and an effort often is made by the operator to facilitate starting by priming the cylinders with gasoline. If a motor has been standing for a long period of time ranging from a week to 3 or 4 months, it may be found to turn over very hard but still this resistance will not be due to compression, for when turning the crank the resistance is uniform just as in turning a wheel with the brake partially set. This is due to the fact that the oil in the cylinders and on the pistons either has drained off or lost its lubricating qualities. If a mixture of kerosene and oil were introduced into the cylinders and the motor turned over a few times it would be found that the motor will turn over more easily and at the same time the compression will be better. This is due to the fact that friction which previously existed between the almost dry surfaces of the pistons and cylinder walls has been eliminated and the film of oil between them prevents the gases from escaping past them. After this condition has been obtained most motors can be started without further priming, whereas if more priming is necessary a mere priming-cupful of gasoline should bring about results.

Sand-Blisters on Tires

There is a prevailing idea in the minds of many motor car repairmen and drivers that every time a lump forms on the tread of a tire it is full of sand, and that the proper course to follow is to cut it open and remove the sand. This theory is right or wrong according to the nature of the case. When the surface in the vicinity of the swelling is unbroken, free from cuts or holes, it is unreasonable to believe that the blister is full of sand, for the rubber tread is not so porous as to allow sand to work itself through and then accumulate in under the tread. The accumulation, however, that is found in such a blister when cut open therefore is not sand, but particles of dried and crumpled cement or friction material that originally served to bind the tread and fabric together, it having been dried and crumpled by friction between the tread and fabric after it had been loosened up through an evil performance or mal-practice of the driver, a defect in the manufacture or from running on a flat or insufficiently inflated tire. On the other hand, if a swelling occurs at or near a hole or cut it is most likely to contain sand which has worked in through the opening. A blister with an opening, like a case of appendicitis, should be operated on as soon as possible, before the case becomes acute, so to speak, to prevent damage and decay of the fabric and avoid a blow-out. The emergency repair consists in lancing the blister carefully in a manner which will enable the operator to thoroughly remove all particles of sand and dirt; after which the wound should be dressed with rubber cement and some of the special waste supplied by the manufacturers. The permanent repair comprises revulcanization of a new section of rubber into the injured part, the revulcanized section to extend several inches beyond the injury in all direction.

Current Motor Car Patents

Motor Car Starting Device—No. 958,985, dated May 24; to Axel M. Walstrom, Minneapolis, Minn.—This patent relates to a simple device for starting the engine of a motor car from the driver's seat. As shown in Fig. 2, it consists of a pulley, P, fastened to the side member of the frame just opposite the starting crank, a flexible connection, F, co-operating with the pulley, D, having one end attached to the handle of the crank, H, and the other end to a lever, D, which is supported on a suitable bracket near the driver's seat; and an automatic means, J, for connecting and disconnecting the engine and crank. The automatic means for making and breaking connection between the engine and crank consists of toggle joints connecting the crank to a sliding collar thereon. A means is provided for connecting the middle joint of the toggles to springs attached to the side members of the frame. Provisions are made also whereby these toggle joints may be adapted to alternately extend and collapse at predetermined points in the revolution of the crank. With this apparatus it is intended that all that will be necessary for the driver to do in starting his motor will be to reach forward and pull back on the lever D.

Starting Mechanism—No. 959,070, dated May 24; to Charles E. Reddig, Hartford, Conn.—The starting device to which this patent relates consists of a heavy spiral spring, a ratchet and a friction clutch device, to be arranged in the flywheel of a motor as shown in Fig 3; or otherwise inserted in a transmission shaft if desired. The device consists of a two-part casing, C, which would serve as a flywheel; a self-starting clutch, T, a regular driving clutch, D, a starting spring, G, and means for operating these as illustrated. The part C of the casing is rigidly connected to the driving shaft S by means of the key K, thereby constituting a flywheel. A starting clutch, T, adapted to engage the inner circumference of this part of the casing, is attached to the end B of the spiral starting spring G; and the opposite end, A, of this spring is attached to the other part of the casing, which in turn has a friction surface for the driving clutch D. A backing ratchet, R, co-operates with the plunger P, which is actuated by the spring G1 and serves to hold the spiral spring in a wound-up position.

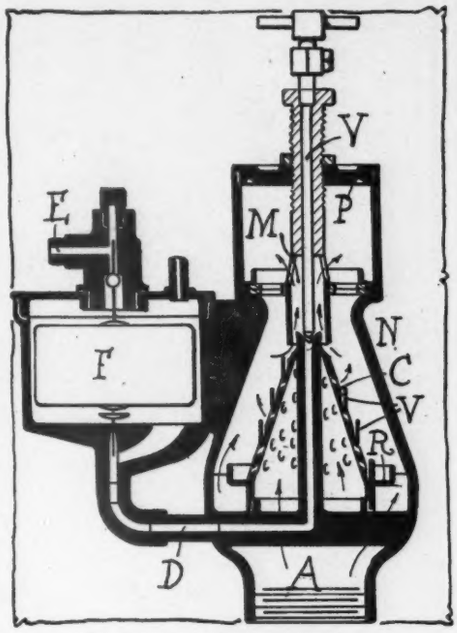


FIG. 1—A NEW CARBURETER

New Carbureter Design—No. 958,897, dated May 24; to James W. Snedeker, Adrian, Mich.—As shown in Fig. 1, this carbureter is a combination of a carbureting chamber, M, a feed nozzle, N, standing therein, a float mechanism for maintaining the gasoline at a uniform level in the feed nozzle, a trunketed cone surrounding the nozzle through the apex of which it projects, a needle valve, V, for regulating the flow of gasoline through the nozzle, a lip, V, on the cone C for directing gasoline in a spiral path around it and a receptacle at the bottom of the cone for the surplus gasoline. In operation the fuel enters at E, passes through the float chamber and then, by means of the duct D, to the spraying nozzle N. Air drawn in at the port A takes the course of the arrows, part of it flowing around the outside of the receptacle R at the bottom of the cone and part of it passing through the perforations therein, then passing on upward through the carbureting chamber M, past the opening of the spraying nozzle into the vaporizing chamber P, and then to the motor. The construction of this carbureter should greatly facilitate starting when the motor is cold, for when the carbureter is primed and gasoline overflows from the spraying nozzle it spreads itself over the surface on the cone in such a manner as to be readily vaporized by incoming air currents.

Lock for Starting Crank—No. 958,815, dated May 24; to Romando D. Markham, Chicago, Ill.—This patent covers a device located on the starting crank of a motor car for the purpose of rendering it inoperative so that a motor cannot be started by means of the crank unless first unlocked by the possessor of the key. The locking device, as shown in Fig. 4, consists of a sleeve S mounted upon the outer end of the crankshaft between the crank and the frame of the machine and a suitable means for positively locking the sleeve on the shaft to prevent longitudinal movement thereof. Except for the sleeve S and the lock contained in the upper end of the starting crank, the starting crank is of conventional design, the spring G being arranged for the purpose of throwing out the crank, and holding it out after a motor has been started. In operation the sleeve S has no longitudinal movement, but the starting crank is forced outward in the regular way, and when in this position on turning the key K, indicated by the dotted lines, extensions of the lock are brought into contact with corresponding grooves on the sleeve S and the starting crank is also thus prevented from longitudinal movement. The key may then be removed and connection cannot be made between the starting crank and the motor.

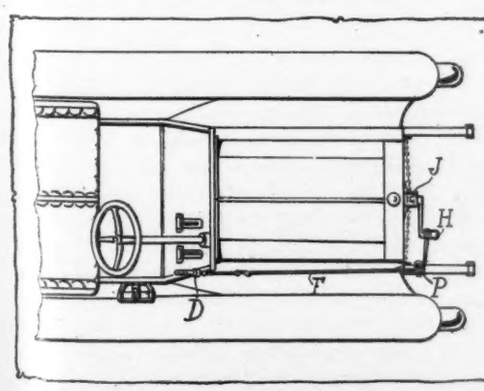


FIG. 2—STARTING MOTOR FROM SEAT

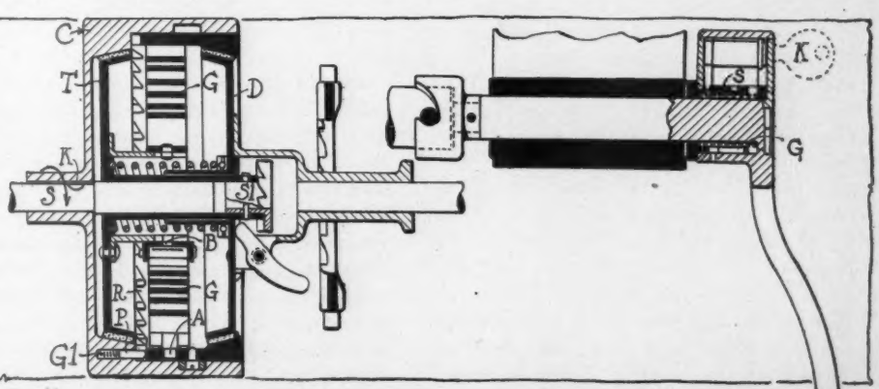


FIG. 3—ANOTHER STARTING DEVICE

FIG. 4—STARTING CRANK WITH A LOCK

MAKES Other Trucks, Too—In addition to its friction-driven trucks the Sternberg Mfg. Co., of Milwaukee, is making gear-driven trucks in 1½, 3 and 5-ton sizes.

Taxicab Concern Insolvent—The Dan Canary Taxicab Co., of Chicago, has been thrown into the hands of a receiver by Circuit Judge Baldwin upon application of the Meyer Printing Co., on a $95.95 claim. John Frady was appointed receiver. The taxicab company, it is stated, ceased doing business June 7, owes $23,000 to other creditors and has assets of only $1,500.

Hupmobile Invasion—To strengthen and increase the export sales which have come to it from Europe, the Hupp Motor Car Co. has sent Calvin H. Dunlap, assistant sales manager, abroad on a campaign which will cover 6 months or a year. Mr. Dunlap sailed from New York June 11. Mr. Dunlap's mission is to establish sales agencies in the principal centers of Great Britain and the continent.

Dixon Company Election—At the annual meeting of the stockholders of the Joseph Dixon Crucible Co. the old board, consisting of George T. Smith, William Murray, William H. Corbin, Edward L. Young, George E. Long, William H. Bumsted and Harry Dailey, was unanimously re-elected. The board of directors re-elected the former officers, namely, George T. Smith, president; William H. Corbin, vice-president; George E. Long, treasurer; Harry Dailey, secretary; J. H. Schermerhorn, assistant treasurer and assistant secretary. William H. Corbin was also re-elected as counsel.

New Studebaker Building—The Studebakers have moved their Chicago motor car department to the new seven-story building at Michigan avenue and Twentieth street. The new building occupies the northwest corner of Michigan boulevard and Twenty-first street and is of seven stories, reinforced concrete. The dimensions are 75 by 175. It is equipped with a passenger elevator, a 16,000-pound freight elevator and a 250-pound automatic elevator. There will be devices on each floor whereby all dirt, refuse, shavings, etc., are transmitted to the basement automatically. There also has been a vacuum cleaning system installed throughout the entire building for cleaning purposes. The entire structure is provided with latest style wash and lavatory fixtures, including shower baths on some of the floors. There also has been installed a homogeneous system for welding and strengthening purposes. In the basement there has been provided a chauffeurs' room, which contains all conveniences, such as telephone, writing materials and reading matter. The salesroom is finished in silver oak, with mosaic hexagon tile, terra cotta color; the wall and ceiling decorations being carried out in a warm gray tone. The furniture throughout the building is silver oak, to match the wood trimming. The stockroom is supplied with all metal shelving. Some idea of the size of the room may be gained from the statement that it requires 14,000 pigeon holes to care for the various parts.

NEW HOME OF THE STUDEBAKER COMPANY IN CHICAGO

Among the Makers

Diamond Picnic Big One—The annual outing given by the Diamond Rubber Co. to its thousands of employes took place Saturday at Silver Lake park, Akron, O. Between 10,000 and 12,000 people attended the affair, which was not marred by bad weather. Tickets for transporting the employes and their families had been distributed and every member of the concern, from manager to office boy, enjoyed the day. A program of athletic events was held.

Winton Reunion—Winton branch managers spent the week of June 6 in Cleveland, and enjoyed the time of their lives. The first 2 days were devoted to business affairs, including a thorough inspection of the 1911 Winton six, details of which will be made public on July 1. When business had been disposed of, the visitors enjoyed seeing Cleveland defeat the Athletics, a theater party, various luncheons and dinners, and a day of athletic sports. On Wednesday the entire party was entertained by Mr. and Mrs. Winton with a lake ride on Mr. Winton's big steam yacht, La Belle, a dinner at Roseneath, the Winton home, and an evening at the theater.

Made Branch Manager—S. C. MacCullough has been made manager of the New York branch of the Pennsylvania Rubber Co., of Jeanette, Pa. Mr. MacCullough was formerly associated with the Fletcher Hardware Co., of Detroit.

Boston Show Dates Set—Boston's next motor show will be held during the week of March 4-11, 1911. This was one of the things decided at the meeting of the Boston Automobile Dealers' Association last week. Another matter that came up for discussion was the charges made for repairs, and some of the dealers stated that there had been kicks made by owners as to overcharging. To obviate any future complaints, it was voted to make the rate 75 cents per hour in all shops conducted by members of the association. Then followed the election of officers, as follows: J. H. MacAlman, president; J. S. Hathaway, vice-president; F. A. Hinchcliffe, treasurer; Chester I. Campbell, secretary; directors, J. W. Maguire, E. A. Gilmore, F. E. Wing, C. F. Whitney, Charles E.

NEW GARAGE OF THE OMAHA AUTOMOBILE CO., OF OMAHA, NEB.

and Dealers

Fay, A. P. Underhill, and the officers named above. Mr. Campbell was chosen manager of the show. It was a re-election for every one of the above named men.

Railroads Accommodating—Motor cars have become such an important factor in commerce that railroad companies are making special facilities for handling them. Among the many improvements being installed in the new freight house of the Big Four railroad at Columbus, O., is a depressed track, especially designed for unloading motor cars. The floor of the car is even with the street, and motor cars can be run in or out without any special loading device.

Sampson Plant Plans—President Benjamin Briscoe makes the announcement that the Pittsfield plant of the Alden Sampson Mfg. Co., which was recently absorbed, will be doubled in capacity. Ground will soon be broken for the erection of a new building, 170 by 70 feet in dimensions, and an additional story is to be erected on the present main building, which is 85 by 160 feet. A new forge and blacksmith shop, 60 by 100 feet, and a paint and testing room, 40 by 150 feet, also will be erected immediately. An investment of $125,000 for new machine tools has been made, and a new building to be used as an engineering department, drafting and testing laboratory will be added to the plant.

Licensed by Simms—The Simms Magneto Co. recently granted a license to the Eisemann Magneto Co., of New York, for its Simms patent timing gear.

Fire in Rim Plant—The plant of the Ames Bending Co. at Celina, Ohio, was burned June 7 with a loss of $50,000. The company was a large manufacturer of motor car tire rims.

Another Akron Plant—If plans which are under way are carried out, Akron will have another large concern for the manufacture of motor car tires, as well as rubber goods of every description. The Portage Rubber Co., of Akron, incorporated some time ago, with a preliminary capital of $10,000, is the nucleus for the concern. Steps were taken recently to increase the capital stock to $1,000,000, and a board of directors was elected, consisting of William Christy, John Kerch, John W. Miller, Judge Dayton, A. Doyle, A. S. Mottinger, James Christy, M. S. Long and H. A. Kendall, the latter of Cleveland. A number of sites for the erection of the plant are under consideration and a deal likely will be closed in the near future. It is the intention to start the erection of the plant as soon as possible. At the start 300 men will be employed.

Pierce's Foreign Eervice—The Pierce-Arrow Motor Car Co., of Buffalo, has opened a foreign service branch at 22 Avenue de la Grande Armee, Paris, France. Information regarding tours and motor routes and duplicate parts and accessories will be provided at this office, which has been established for the exclusive convenience of Pierce-Arrow patrons.

New York Dealers' Election—At a meeting held recently, William M. Haradon was elected president of the New York Automobile Trade Association; C. W. Wurster was re-elected first vice-president; W. W. Burke, second vice-president; W. H. Yule, treasurer, and Walter R. Lee was re-elected secretary and general manager for what will be his fourth consecutive term.

Big Lamp Shipment—The Badger Brass Mfg. Co. only recently shipped two full carloads of Solar lamps that are to be used on the 1911 models of the Chalmers Motor Car Co. A shipment of the same size is made to the Chambers company each month. The Badger Brass company is making more additions to its plant and reports that it is in position to take care of its 1911 business without difficulty.

Coupon Scheme Successful—Garage keepers and dealers throughout the country will be pleased to know that a cash system inaugurated by the Licensed Motor Car Dealers' Association of Los Angeles is proving successful. This has been worked on the basis of coupons. Five dollar coupon books are sold for 5 per cent off, and these coupons are interchangeable at practically all the garages and supply houses. A local bank carries the account and the coupons are redeemed for cash. On May 15 practically every garage belonging to the association went on a cash basis. Not as much as 1 gallon of gasoline was sold on credit. There were a few complaints during the first week, but not as many as had been expected. By the second week practically every customer knew that he must pay cash. Since then there has been no questioning. This has several great advantages. It not only eliminates had accounts, but enables the owner and customer to settle all disputes as to work at the time it is finished. Every garage man knows how much is lost through disputes over repair bills. To keep the good will of the customer, a man often will cut off so much that the job becomes a big loss. Many times these complaints are not made until a month after the work is complete. Under the new system, a man is expected to pay for the work when he takes his car out, and if there is any argument it is argued and settled on the spot.

THE CUTTING PROPERTIES OF TOOL STEEL

TOOL-STEELS may, for the purposes of this paper, be defined as steels which can be made hard enough to cut metals. The ability of one substance to cut another is dependent on a difference in their hardness. Therefore, in comparing the cutting properties of various steels, it might at first sight appear sufficient to range them in a series of increasing hardness. But this would give a very imperfect and misleading impression of their cutting properties, since the hardest steels are not necessarily the best adapted for use in cutting operations. It is important that a tool should not only cut, but continue cutting for a considerable time before becoming blunt. If, therefore, we can arrive at a definition of bluntness, or—since bluntness is a variable quantity—at a standard of bluntness, it will obviously be possible to arrange all tool steels in a series, according to the length of time they would continue cutting a given material under specified conditions, before arriving at the standard condition of bluntness, and such a series would give a more correct representation of their relative value as materials for use in cutting tools.

In order to do this, it would be necessary to select certain definite conditions—namely, the shape of the cutting tool, the thickness and width of the shaving, and the speed at which the tool should travel across the material being cut. These conditions having been standardized, it would be possible to express the quality of any tool steel by a number, which might be called its durability, denoting how many minutes it would continue cutting under the standard conditions before becoming blunt, just as its strength can be expressed by a number, denoting how many tons weight per square inch of section would be required to break it.

But here the question arises whether the relative durability of various steels is independent of the conditions of cutting. If steel A is quite as durable as steel B in cutting iron, will it also be twice as durable in cutting brass? There is some reason to believe that it will not.

Equally important is the question whether, and to what extent, the relative durability of tool steels is dependent on the cutting speed. Will they stand in the same order of merit whether tested at 20 feet, at 60 feet or at 100 feet per minute? To determine this, it is necessary to make cutting tests with each steel at each of a series of speeds. This can be done in a lathe by turning down a bar; but in practice such tests are apt to be inconclusive, because of the difficulty of standardizing the conditions. It is difficult to secure a uniform material, to maintain a uniform cutting speed as the diameter of the bar decreases, to maintain a uniform thickness of shaving as the tool wears, and it is especially difficult to insure

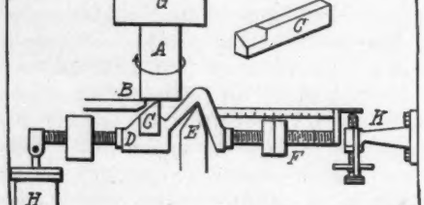


FIG. 2—DIAGRAM STEEL TESTING MACHINE

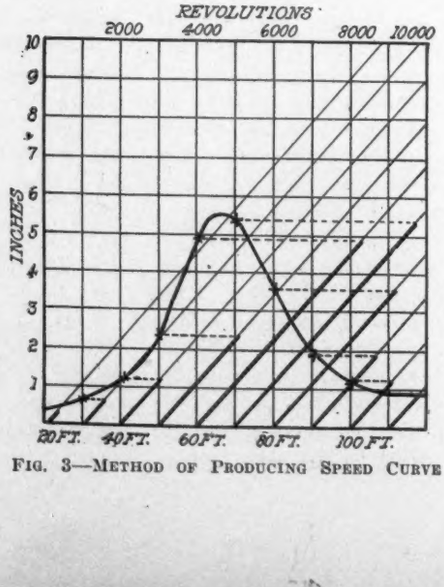


FIG. 3—METHOD OF PRODUCING SPEED CURVE

EDITOR'S NOTE—The following paper is by Edward G. Herbert, B. Sc., London, England.

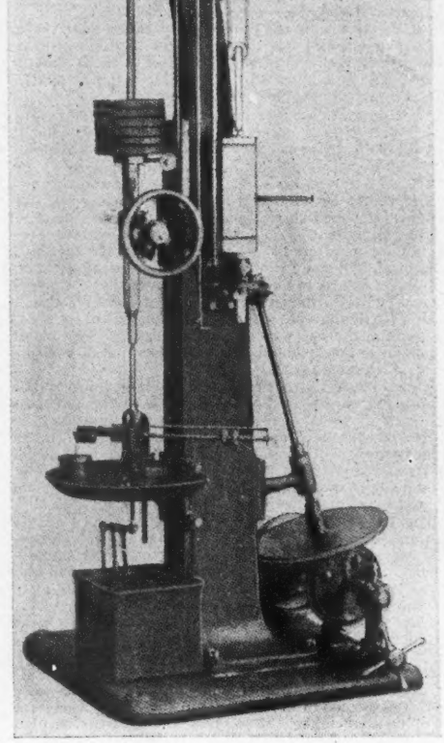


FIG. 1—TOOL FOR TESTING STEEL

that all tools are worn to the same condition of bluntness.

The tool steel testing machine was designed to overcome these difficulties. The machine is illustrated in Fig. 1, and its principle and construction will be understood from the diagram, Fig. 2, in which A represents the element on which the cutting tests are made—that is, a tube, usually of steel, ¾-inch in diameter and ⅝-inch bore, formed by drilling from the solid bar, and subjected to a heat treatment which renders it uniform in hardness. The tube A revolves about a vertical axis, while its lower end rests on a fixed abutment B of hardened steel. The sample of steel to be tested is made into a cutting tool C, which is ground to a standard angle, and held in a vice D, with its cutting edge radial to the tube. The vice D is mounted on knife edges E lying in the plane of the end of the tube. By means of a steelyard F, with a movable weight and scale, the tool can be caused to press upwards against the edge of the tube with any desired force, and cut it away with a turning action.

The tube is held in contact with the abutment B by means of a weight G, the downward pressure of which is always greater than the upward pressure of the tool. As the tube is turned away by the tool, it is fed downwards by the weight G, so that the end of the tube, though it is constantly being turned away, is constantly held in contact with the abutment B, and the point at which cutting takes place is stationary. A dashpot H is connected to the vice to prevent jarring or vibration.

As the test proceeds, the cutting edge is gradually worn away, and as this takes place the vice tilts on the knife edges. The angle through which the vice tilts is proportional to the blunting of the tool, and this is actually measured in thousandths of an inch by means of the micrometer K, which is mounted on the pillar of the machine, and is brought to bear on a projection from the end of the steelyard, so as to measure its movements due to the wear of the tool.

Turning now to the illustration of the machine, Fig. 1, it will be seen that the tube is driven by a spindle, which receives its motion through cone and friction disk gearing, capable of giving it a wide and continuous range of speeds. A paper-covered drum, mounted beside the column of the machine, is driven through worm and spur speed-reducing gearing from the spindle. Vertical movements of the spindle are communicated through a fine chain to a pencil mounted on a vertical sliding bar.

When the machine is set in motion the pencil draws a diagram, in which horizontal distances represent the number of revolutions made by the tube and vertical distances represent vertical movements of the spindle—that is, the length of tube turned away by the tool. The slope of the line represents the rate at which the tube is being turned away; or, in other words, the feed or traverse of the tool in inches per 1,000 revolutions of the tube.

With this machine all the conditions of a cutting test can be regulated and kept constant. The cutting speed can be exactly regulated by means of the friction gear, in conjunction with a pendulum speed indicator on the machine. The material of the tube is uniform. The width of the shaving, equal to the thickness of the tube wall, is constant. The thickness of the shaving is regulated by adjusting the weight on the steelyard. It is shown by the slope of the diagram, and is kept constant in a manner to be described. The blunting of the tool is measured by the micrometer as the test proceeds, and all tests are stopped when the predetermined degree of bluntness has been attained, this condition being indicated by the ringing of an electric bell connected to the micrometer.

Fig. 3 shows the character of the diagrams produced. Lines are ruled on the squared paper, sloping to the right at an angle corresponding to the standard traverse—1.2 inches per 1,000 revolutions. The pencil is set on one of these lines; and, by suitable adjustment of the weight on the steelyard, the tool is caused to take the proper thickness of shaving, which is indicated by the pencil traveling up the ruled line. The test is continued until the micrometer shows that the cutting edge has been blunted by the predetermined amount; it is then stopped, and the durability of the tool is given by the number of inches of test tube turned away. Tests are made at cutting speeds from 20 feet per minute to the highest speed at which the tool will cut, and the results are plotted in the form of a speed curve, in which ordinates represent the durability of the tool, and abscissæ represent cutting speeds.

A set of speed curves is shown in Fig. 4, in which A is the curve of a carbon steel. B, B1 are both from the same high speed steel, differently hardened, and C is from another high-speed steel.

It will be noticed that at the low speeds, up to 50 feet per minute, the carbon steel is more durable than the high speed steels, but at the higher speeds the carbon steel is less durable.

The fact that a high-speed steel tool will not keep its edge so well as the carbon-steel tool under a light cut at a low speed has long been familiar to engineers; but the fact that the

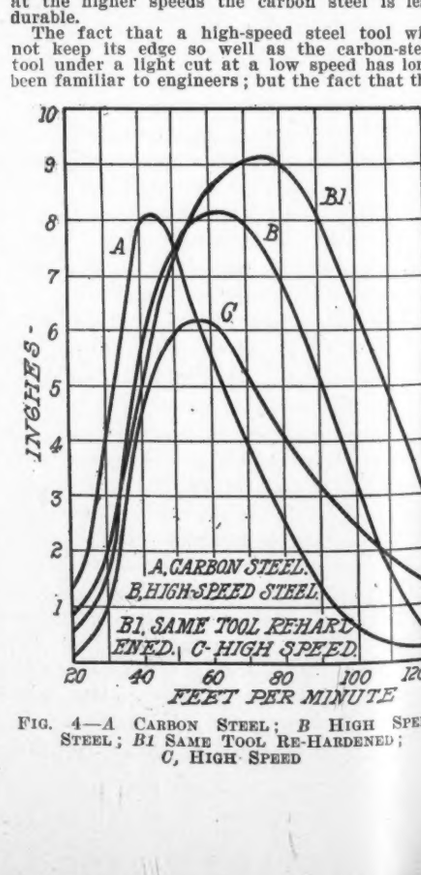


FIG. 4—*A* CARBON STEEL; *B* HIGH SPEED STEEL; *B1* SAME TOOL RE-HARDENED; *C*, HIGH SPEED

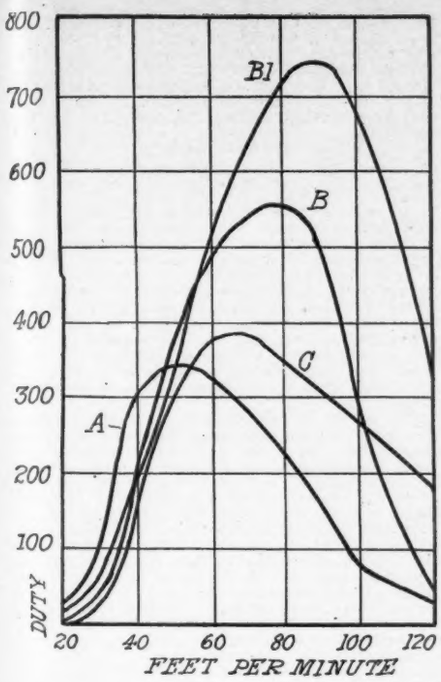


FIG. 6

durability of a high-speed steel tool, working under a light cut, can be greatly increased by running it at a high speed, and that under these conditions—a light cut and a high speed—it will keep its sharp edge better than a carbon-steel tool, was not generally known before the first publication of the speed curves produced by the tool steel testing machine.

Perhaps the most striking and unexpected feature of the speed curves is this—that the durability of all steels, without exception, is very low at low speeds, under light cuts, and that the durability of the cutting edge increases as the speed is raised.

In considering these curious facts it is important to bear in mind that we are here dealing with durability as measured, not by the length of time the tool will continue cutting before becoming blunt, but by the amount of metal it will cut away before becoming blunt. To turn away an inch of tube at 40 feet per minute obviously takes twice as long as turning away an inch at 80 feet per minute cutting speed, the thickness of the shaving being the same in each case. If the speed-curves are drawn out on a time basis, they asume a rather different form, as shown in Fig. 5. From this it appears that the maximum time durability of the carbon steel was actually higher than that of the best high speed steel, but that this maximum occurred at a low speed.

Neither the curves in Fig. 4 nor those in Fig. 5 give a correct view of the relative value of carbon and high speed steels for the rapid removal of metal. The best steel for this purpose is not the one that will keep its edge longest when run at a slow speed, nor even the one that will remove the greatest amount of metal before becoming blunt. The engineer usually requires the steel that will remove the greatest amount of metal per hour without requiring too frequent sharpening. If we multiply the number of inches of tube turned away by the corresponding cutting speed, we obtain a quantity which may be termed the duty and which is proportional to the time rate of removing metal, and to the durability of the tool. It is reasonable to assume that when this quantity attains a maximum the ideal working conditions have been reached. In Fig. 6 are shown duty curves obtained by calculations from the speed curves, Fig. 4, and this diagram shows the relative values of the steels for the rapid removal of metal. Fig. 7 gives an even more striking comparison between the duty curves of A, a carbon steel; B1, a good high speed steel; and D, one of the new vanadium steels. When the vanadium steels were first brought out, it was generally supposed that they were not capable of working at higher speeds than the older tungsten steels. The tool steel testing machine has shown that they are capable of working, and that they may attain their maximum durability at speeds which are much too high for the ordinary tungsten steels, and this has now been amply confirmed in practice. It also appears that at the very low speeds these steels are much less durable than either high speed steel or carbon steel. It might indeed be inferred from Fig. 7 that, in order to get good results from the vanadium steel, it would be necessary to work it at a high speed; but this inference would not be correct, as will be shown later.

Two questions here present themselves for consideration. What is the cause of the differences in the durability of the cutting edge or a given steel at different speeds? What are the changes in the physical condition of the steel which correspond to these changes in durability?

If it had been found that an increased cutting speed involved a simple decrease in the durability of the cutting edge, it would have been natural to answer the first question by saying that we were dealing merely with the rubbing of metal against metal; that this rubbing was more severe at the higher speeds, and therefore caused more rapid wear. But when we find that an increase in the cutting speed is actually accompanied by an increase in the durability of the tool, that this durability attains a maximum at a certain speed, which is different for steels of different chemical composition, and that the durability then declines as the speed is further increased, it becomes evident that this explanation is insufficient. The durability of the cutting edge cannot depend simply on the rubbing of metal against metal, but it may depend on that which results from the rubbing—namely, the evolution of heat and the consequent rise in the temperature of the cutting edge, a rise which naturally becomes greater as the speed increases.

Assuming this to be the case, we find that the durability or wear resisting property of all tool steels is relatively low at normal atmospheric temperatures, that it increases as the temperature rises, attains a maximum at a certain temperature depending on the composition of the steel, and declines as the temperature is further raised.

If this theory be correct—if it be a fact that the observed changes in the durability of the cutting tool are mainly or entirely due to changes in the temperature of the cutting edge—it should be possible to produce the same changes of durability in a tool running at constant speed by simply varying its temperature.

The most obvious method of varying the temperature of a tool cutting at constant speed is that of varying the weight of the cut, since we know that the heat generated by a light cut is less than the heat generated by a heavy cut at the same speed. In order to test the theory it would therefore be sufficient first to measure the durability of a tool cutting at a slow speed under a light cut; the depth of cut should then be increased, the speed remaining unaltered, and the durability again be measured, and so on with gradually increasing cut; and we should expect to find the durability of the cutting edge increase with the depth of cut until it attained a maximum with a particular cut, after which the durability should decrease as the cut was further increased. The results, when plotted out, should give a curve similar to the speed curve of the same steel.

Experiments have been made on these lines, and the results are shown in Figs. 8 to 11. A carbon steel tool was run at 20 feet per minute, and its durability was measured at each of a succession of feeds. Similar series of tests were made at 40 feet and 60 feet per minute. The resulting curves are shown in Fig. 8. A speed curve was then made from the same tool in the ordinary way, with constant feed and varying speeds, and this curve is shown in Fig. 9. It will be seen that in each case the durability of the tool increases to a maximum and then decreases. In Figs. 10 and 11 the results of the same experiments are given, with the durability of the tool expressed in minutes instead

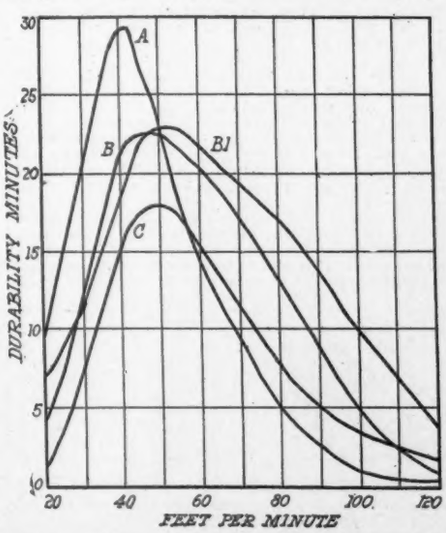


FIG. 5—SPEED CURVES ON TIME-DURABILITY BASIS

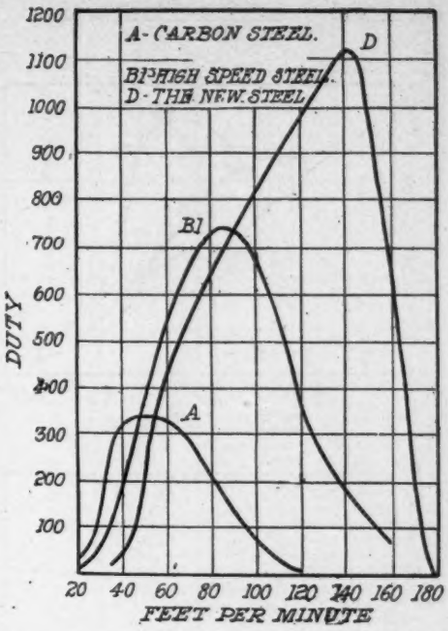


FIG. 7—*A* CARBON STEEL; *B1* HIGH-SPEED STEEL; *D* THE NEW STEEL

of in inches of tube turned away; and here, again, the similarity of the curves is sufficiently striking.

These results give support to the heat theory, but they cannot be said to establish its truth, since there is a possibility that the variations in durability which follow from changes of feed and from changes of speed, though similar in character, may be due to different causes. It therefore seemed desirable to test the theory further by applying artificial heat to the tool it was cutting.

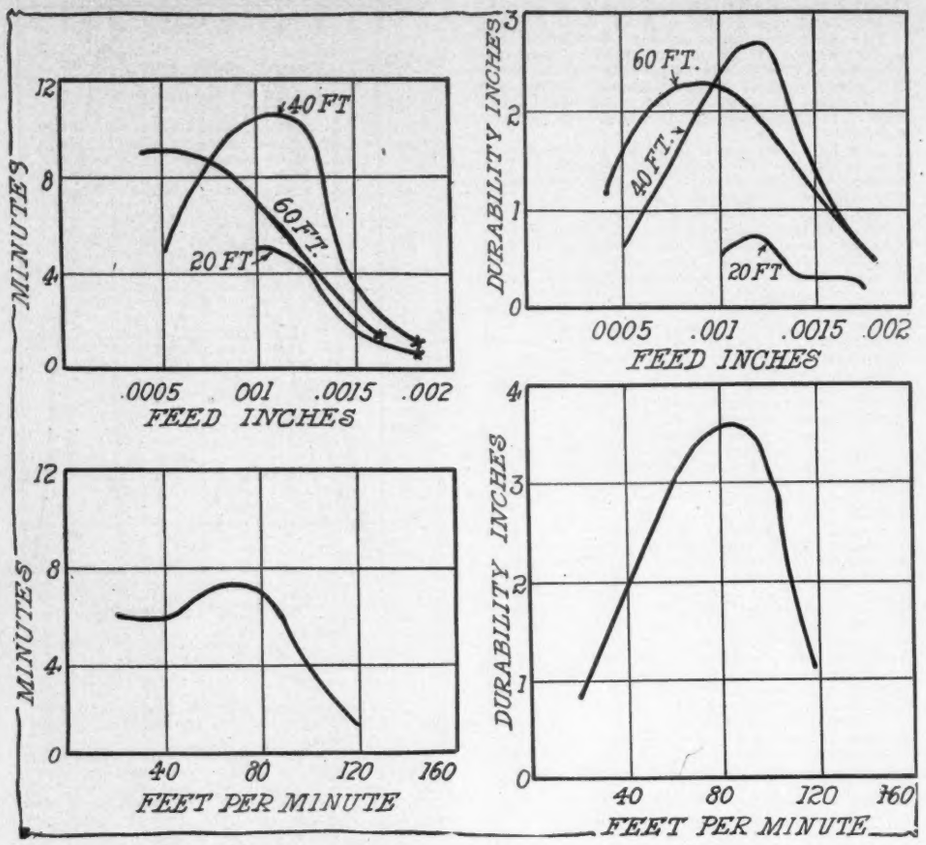
Durability tests are normally made on the testing machine, with the cutting tool flooded with a copious stream of cold water, which is pumped up the interior of the test tube by means of a circulating pump. In this way both the tube and the body of the tool are kept cold, and a rise of temperature can only take place in the extreme cutting edge, which is embedded in the metal, and therefore protected from contact with the water. It may be supposed that at high speeds the cutting edge is raised to a temperature sufficiently high to draw its temper, thus permitting successive portions of the edge to be more readily rubbed away; and it would seem to follow that at moderate speeds the rise of temperature is not sufficient to soften the steel, but that it has the contrary effect of hardening it, or otherwise increasing its capacity for resisting wear.

Although the water does not come into actual contact with the cutting edge, it is certain that it exercises a considerable cooling effect, by conducting heat away from the shaving as it is formed, and the amount of cooling will depend upon the temperature of the water.

A speed curve was made from a vanadium steel tool, the tests being made in the ordinary way, with cold water flooding the tool. This curve is shown in Fig. 12, page 37. The durability of this steel rose with great suddenness when the speed of 40 feet was exceeded, and this portion of the curve was selected for the heat experiment. Gas burners were placed under the tray of the testing machine, and the water was caused to circulate until its temperature became constant at 65 degrees Centigrade. The durability of the tool was then tested while cutting at 40 feet per minute and flooded with hot water. The tool cut away 6.6 inches of tube under these conditions, whereas it had only cut away 1.4 inches at the same speed in cold water. This clearly shows that the increase of durability shown by the speed curve between 40 feet and 50 feet per minute was due to a rise in temperature caused by the increase in speed. The result is not surprising, since it is known that high-speed steels have the property of increasing in hardness as their temperature is raised, and it is probable that the new vanadium steels have the same property.

It does not, however, appear to have been established that the carbon steels possess this property; hence it was specially interesting to ascertain whether the application of artificial heat would have the effect of raising the durability of a carbon-steel tool.

An experiment was made with a steel containing 1.33 per cent carbon, which was quenched in water at 780 degrees Centigrade, and tempered by immersion in a water bath for 30 minutes at 100 degrees Centigrade. A



FIGS. 10 AND 11 FIGS. 8 AND 9

speed curve was made from this tool cutting under cold water. This curve is shown at A, Fig. 13. The gas burners were then placed in position, and the circulating water was brought to a temperature of 67 degrees Centigrade. A complete speed curve was made with the tool cutting in hot water, and is shown at B, Fig. 13. The result is exactly what would be expected, assuming the heat theory to be correct. The speed curve is moved to the left; the durability of the tool is increased at all speeds below 48 feet per minute, and decreased at all higher speeds. It will be noticed that the maximum durability of the tool was considerably less when cutting in hot water; and this is difficult to account for, except on the supposition that the tool had become somewhat softened, either by continued immersion in the hot water or by repeated grinding. In order to test this, a further speed curve was made from the same tool under cold water. This curve is shown at C, Fig. 13. It is much lower than either of the preceding curves, and it lies further to the right than the first curve, A, made with cold water. It will be shown later that a normal result of drawing the temper of a tool is to lower the speed curve and move it to the right.

These results appear to establish the heat theory of the durability of cutting tools, working under the special conditions of the tool-steel testing machine. It remains to inquire how far this theory holds good when the tools are working under ordinary workshop conditions.

Many scientific tests of cutting tools have been made, the best known being those of F. W. Taylor, described by him in a paper read before the American Society of Engineers in 1906. In these, and in most of the other tool-steel experiments whose results have been published, no attempt was made to measure variations of durability due to changes in the working conditions. Instead, a standard time durability was adopted, and the conditions of cutting were varied until a standard tool just failed at the end of the specified time—usually 20 minutes. A series of combinations of speed, feed and depth of cut was found, under which the conditions of constant durability was fulfilled.

According to the heat theory, constant durability involves constant temperature of the cutting edge. In order, therefore, to test the heat theory by means of Mr. Taylor's results, it will be necessary to deduce a law of constant temperature in terms of speed, feed and depth of cut. If this law of constant temperature, deduced from general dynamical considerations, proves to be the law of constant durability under which Mr. Taylor's results range themselves, it will be safe to conclude that constant temperature is the essential condition of constant durability.

In attacking this problem the author began by making an assumption which may appear somewhat extravagant. It was assumed that the action of the portion of metal which is in process of being cut away by a tool is similar to that of a jet of water impinging on a fixed obstacle; that the tool is a rigid body on which a stream of steel impinges; and that the law governing the evolution of heat by this stream of steel is the same law which governs the evolution of heat by a jet of water suddenly checked. This law is that the rate at which energy is dissipated in the form of heat is proportional to the cube of the velocity of the jet and to the area of the jet. Assuming this law to hold good in the case of a cutting tool, let us examine the evolution of heat as it affects the temperature of a very small portion of the cutting edge a, Fig. 14. The portion of metal which actually impinges on this element of cutting edge is that contained between the parallel lines, and the heat generated in unit time will be proportional to the sectional area of this portion of the shaving, multiplied by the cube of the cutting-speed. Since the area contained between the parallel lines is proportional to the thickness of the shaving, it follows that

$$h \propto S^3 t,$$

h being the heat evolved in unit time, S the cutting speed, and t the thickness of the shaving at this point. If only this element of the shaving were in question, the temperature at a would depend on the rate of heat evolution h; but heat is also being generated in all the adjacent parts of the shaving, and this additional heat H, which, when a is very small, is proportional to the whole sectional area of the shaving, will also affect the temperature at a by conduction. The temperature at a therefore depends upon the total heat $h + H$, which is proportional to the thickness of the shaving, multiplied by the area of the shaving, and then

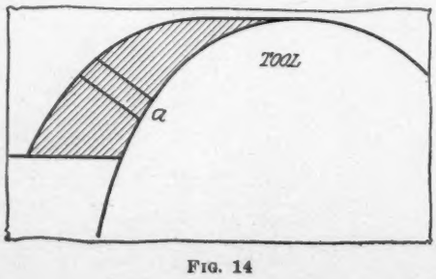


FIG. 14

multiplied by the cube of the cutting speed.

$$h + H \quad t\,a\,S^3.$$

Therefore the condition for constant temperature at the point a is that $t\,a\,S^3$ should be constant, and the law of constant temperature, which should also, by hypothesis, be the law of constant durability, may be expressed by the equations

$$t_1 a_1 S_1^3 = t_2 a_2 S_2^3$$

$$S_2 = S_1 \sqrt[3]{\frac{t_1 a_1}{t_2 a_2}}.$$

In cutting with a round-nosed tool, failure will generally take place where the shaving is thickest, and t may be taken as representing the maximum thickness of the shaving, which is generally proportional to the feed.

In Fig. 15 the full lines represent the results of Mr. Taylor's experiments, abscissæ representing areas of cut—feed × depth of cut—and ordinates representing the corresponding cutting speeds at which the tool failed in 20 minutes. The experiments were made on a mild-steel bar, with a round-nosed tool of standard shape.

The dotted curves in Fig. 15 were obtained by calculation, employing the cube formula, and taking the point A as the datum point. Thus the dotted curve through A was obtained by assuming the thickness of shaving constant—feed, 3/16 inch—and calculating for varying areas of cut. The resulting curve agrees almost exactly with that obtained by experiment. A was then taken as the datum point for a calculation, assuming the area of cut to remain constant, and the thickness of shaving, feed, to be reduced from 3/16 inch to ⅛ inch. This gave point B, and a further calculation, assuming constant feed and varying area of cut, gave the dotted curve through B, which again corresponds with that obtained by experiment. Now starting again from point A, and calculating for constant area and a reduction of feed from 3/16 inch to 1/16 inch, we obtain point C and curve x^1. This does not agree so well with the results of experiment, but this non-correspondence is accounted for by the fact that, with a broad-nosed tool working on very light cuts. the thickness of shaving is not proportional to the feed. Ascertaining graphically the actual thickness of the shaving in each of Mr. Taylor's experiments, and substituting these values in the formula, we obtain the curve x^2, which agrees perfectly with the results of the experiments.

The cube law of cutting speeds is therefore definitely established, and its practical utility is obvious. It may be thus expressed in words: For constant durability of the cutting tool, the speed varies inversely as the cube root of the product of area of cut by thickness of shaving.

The value of the cube law as evidence of the correctness of the heat theory of durability is considerable, though it is possible that the validity of the reasoning by which it was deduced may be called in question. One fact may be mentioned which is at variance with the assumption that the action of the stream of steel is similar to that of a jet of water. The pressure which a jet exerts on an obstacle against which it impinges is proportional to the square of its velocity; but it seems to be established that the pressure exerted by the shaving on a cutting tool is nearly constant for all cutting speeds. It certainly does not vary as the square of the speed. No explanation of this discrepancy can be offered at present. The cube law was arrived at from theoretical considerations of the heat evolved in cutting and it is confirmed by the results of most carefully-conducted experiments. It correctly expresses the conditions for constant durability of the cutting tool, and it must be taken as expressing also the conditions for constant temperature until a more correct expression can be found.

One further piece of evidence may be adduced in favor of the heat theory. It has been pointed out that the tool-steel tests are normally made with the cutting tool flooded with water, and that this must exercise a considerable cooling effect on the actual cutting edge, although the latter may never come into contact with the water, owing to its being embedded in the metal. But cutting without water, then, we shall allow the edge to become hotter, and if we are right in believing that an increase of temperature increases the durability of the cutting edge—in carbon as well as high-speed steels—then it follows that a tool cutting at a low speed with a light cut should be more durable when dry than when flooded with water. The effect of omitting the water should be to compress the speed-curve to the left—an effect similar to that caused by substituting hot water for cold, but probably still more marked, because the rise of temperature is likely to be much greater.

This crucial experiment was tried, and the result is shown in Fig. 16. A is the speed curve of a carbon steel cutting under water. B is the speed curve of the same tool cutting dry. The compression of the speed curve, and the increase of durability at the lower speeds, are what the heat theory would lead us to expect; but we are confronted with an unexpected phenomenon in the extraordinary increase in the maximum durability of the cutting tool. This experiment has been repeated with differently shaped tools, and on tubes of

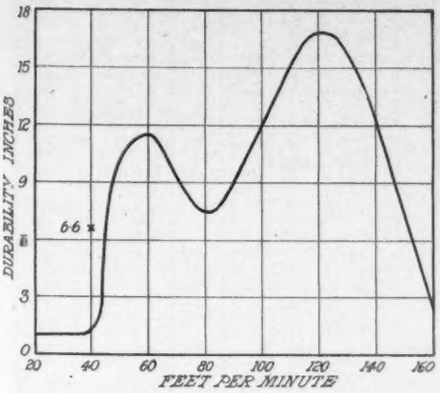


FIG. 12—TUNGSTEN-VANADIUM STEEL CUTTING WITH COLD AND HOT WATER

different composition, and similar results have been obtained. As a possible explanation of the great increase in the maximum durability of the tool, it may be suggested that the tube itself may have become sufficiently heated to undergo some softening. Against this explanation it may be noted that the same phenomenon occurred when the tube was of soft low-carbon steel, which would scarcely be softened by the heat generated in cutting it.

Considerable stress has been laid upon the heat theory of durability—the theory that the durability of the cutting edge is mainly, if not entirely, dependent on the temperature to which it is raised in cutting, and independent of the cutting speed and weight of cut, except in so far as these affect the temperature. Apart from its scientific interest, this theory has an important bearing on the character and meaning of the results obtained on the testing-machine. Minute cuts, taken under special conditions, are being dealt with, and it might appear that the results would give very little information as to the probable behavior of steel under the very different conditions of the workshop.

When, however, it is realized that each speed on the testing-machine corresponds to a definite temperature of the cutting edge; that the range of temperatures so obtained includes the whole range of cutting temperatures occurring in workshop practice, and that the durability of a tool—of a given shape and cutting a given material—depends entirely on its temperature, then it becomes evident that the changes of durability which we have been considering are changes which must always take place at these temperatures, no matter how they are produced. The heat theory is the connecting link between the results obtained on the testing-machine and the whole range of metal cutting operations of the engineering workshop.

Already there is an accumulation of confirmatory evidence on the workshop side. It has been found, for instance, that a tool stands up better if it is put in the fire immediately before being set to work, so that it starts warm, while in quite a number of workshop operations it has been found possible to increase the durability of the cutting tool by increasing the cutting speed, although such an increase of speed goes against the instincts of the average workman.

In considering what follows, it will be useful to bear in mind that cutting speed and temperature are interchangeable terms, and that the speed curve is really a temperature-durability curve. It is necessary for the present to study changes of durability in relation to cutting speed, because the speed is definitely known, whereas the corresponding temperature of the cutting edge cannot be directly measured.

Most of the speed curves hitherto examined have a simple form, consisting of a rise to a maximum durability, followed by a fall towards zero durability as the speed is raised. It will have been noticed, however, that the speed curve in Fig. 12 is less simple in form. This curve has two points of maximum durability, at 60 feet and 120 feet, respectively, and a very distinct depression between them, the lowest point occurring at 80 feet. This phenomenon is exceedingly common, and is not confined to any one class of steel. The double-peaked curve has been obtained from carbon, tungsten, and tungsten-vanadium steels. A set of double-peaked curves is shown in Fig. 17, in which A is a carbon steel; B a low-tungsten steel, which was made white hot and quenched in water. This steel is remarkable for its high durability at very low speeds, far exceeding that of the carbon steel. The makers of this special steel have used it in their own works for machining articles of hard material which could only be run at very low speeds, and the curve confirms its special suitability for this class of work. Curve C is from a tungsten steel, and curve D from a tungsten-vanadium steel. Each of these curves is of the double-peaked variety, and it was for some time thought that the position of the depression—to the right of the main peak in carbon steel, about the center of the curve in tungsten steels, and to the left of the peak in tungsten-vanadium steels—would be a definite indication of the class to which the steel belongs. This is not the case. Experience shows that the depression may occur at any point in the curve of any steel, and that its position varies according to the particular treatment the steel has received in hardening.

The depression, or dimple, in the speed curve is perhaps the most remarkable fact brought to light by the tool-steel testing-machine. The phenomenon is so marked—amounting sometimes to an almost total loss of durability at a particular speed, which may be intermediate between two speeds, each of which gives the tool the highest durability of which it is capable—that it is almost incredible it should have entirely escaped observation in the thousands of cutting operations of every-day practice. That the phenomenon may exist, and yet have been unobserved, will be seen in the case, for example, of a turner who had set his lathe to a speed and cut corresponding to a depression in the speed curve of his tool. He would notice that his tool rapidly became blunt, and he would conclude either that his speed was too high or that his tool had become softened. In the former case he would reduce his speed, and so get to a higher point on his speed curve. An increase of speed would be equally effective, but the workman would be very unlikely to experiment in this direction. If he concluded that his tool was soft, he would have it rehardened, and, as will be shown later, this would be likely entirely to change the form of its speed curve and the position of the depression. Unaccountable failures of cutting tools are among the commonest of workshop experiences, and may be frequently due to working at the critical temperature of low durability.

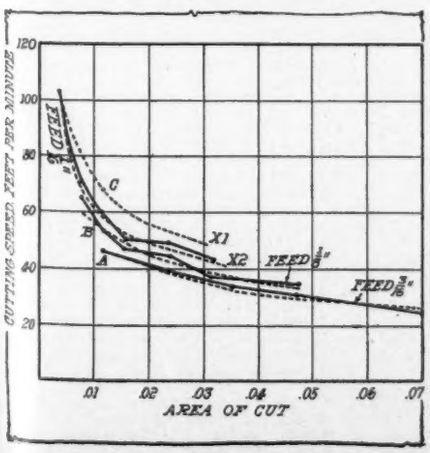


FIG. 15—CUBE CAM OF CUTTING SPEEDS

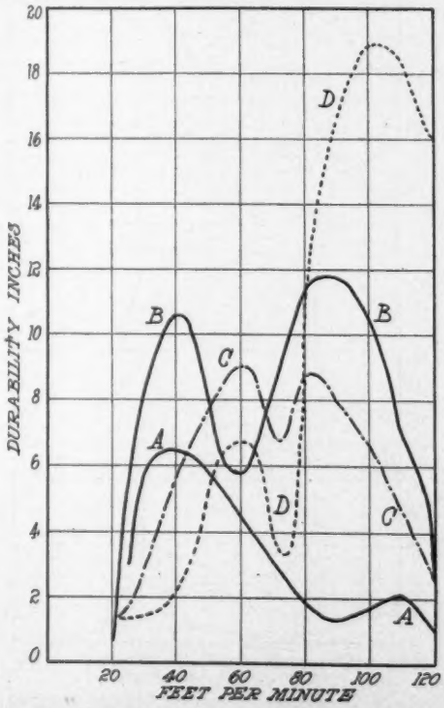


FIG. 17—DOUBLE-PEAKED SPEED CURVES

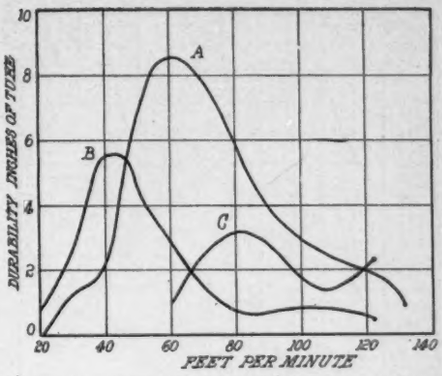


FIG. 13—CARBON STEEL CUTTING WITH COLD AND HOT WATER

But suppose the speed and cut to be such as to bring the tool to a point on the right-hand peak of the speed curve. Before the tool can arrive at the high temperature corresponding to this point, it must obviously pass through the lower temperature corresponding to the depression; and if the rise of temperature is gradual, the tool might be expected to be considerably damaged, while passing through the critical temperature corresponding to the depression. It might be anticipated, however, that if the tool were allowed to continue cutting, it would soon attain a higher temperature corresponding to some point on the right-hand peak of the curve, when it would regain its durability, and, although in a somewhat damaged condition, would continue cutting for a considerable time before finally failing.

Now it is a fact that evidence has come from several independent sources to the effect that this is precisely what does frequently take place in cutting with high speed tools.

The tool, soon after being set to work, apparently fails—it becomes blunted to some extent; but if it is allowed to continue cutting, it builds up, according to the workshop expression, it recovers its durability, and may continue cutting for a considerable time without further loss of sharpness. It appears, then, that the phenomenon exhibited in the speed curve is one which has been frequently observed in practice, though its precise character has never been suspected.

In order to ascertain in what manner the durability of a tool is affected by its temper, several series of experiments were made with carbon steels. These experiments were carried out in co-operation with Harry Brearley, who undertook the heat treatment and the chemical analysis of the steels.

The first experiments were made with a steel having the following analysis:

	Per cent
Carbon	1.33
Manganese	0.39
Silicon	0.19
Sulphur	0.038
Phosphorus	3.033

The tools, all cut from the same bar, ¾ inch by ½ inch, were quenched in water at 780 deg. Cent. One was left dead hard, and the remainder were tempered by being immersed for 30 minutes in an oil bath at the following temperatures respectively: 100 deg., 150 deg., 175 deg., 200 deg. and 275 deg. Cent. The speed curves of these tools are given in Fig. 18.

It will be seen that the dead-hard tool gave a narrow curve with a high maximum durability at 60 feet. The tool tempered at 100 deg. gave a broader curve in the same position.

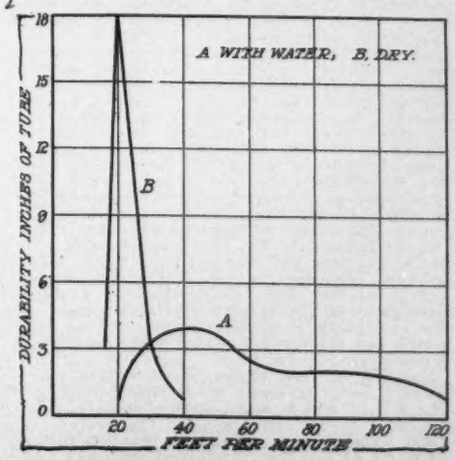
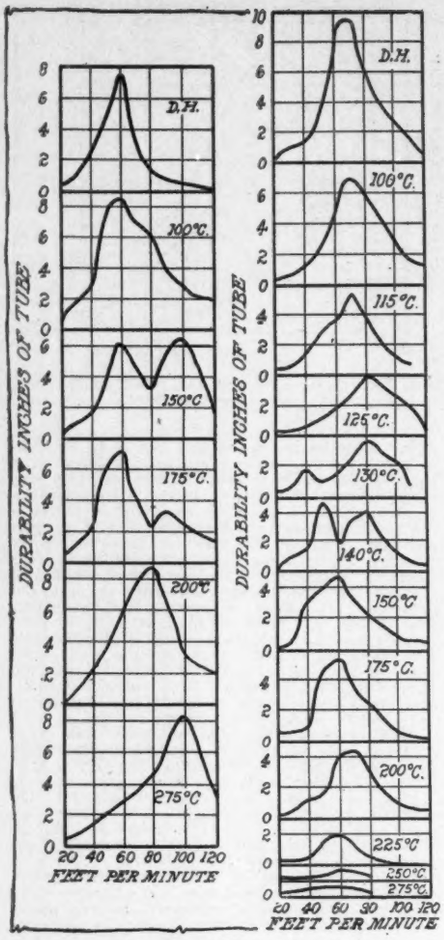


FIG. 16—CARBON STEEL CUTTING



FIGS. 18 AND 19—TEMPER AND DURABILITY, CARBON STEEL

The curve of the 150 deg. tool shows a remarkable change. It is broader than the preceding one, and is broken into two distinct peaks, with a very deep depression between them.

The next tool tempered at 175 deg. also gives a double-peaked curve, but the first peak has increased and the second shrunk in size.

In each of the remaining curves only one peak persists, and moves progressively to the right, so that the highest durability at the high speeds was obtained from this particular steel from the tool that was the lowest in temper.

In order to confirm and to trace out more completely the changes in the form of the speed curve, a second series of tests was made with a steel having the following composition:

	Per cent
Carbon	1.25
Manganese	0.27
Silicon	0.16
Phosphorus	0.015
Sulphur	0.011

The tools were treated in exactly the same manner as those in the first series, but were tempered at a closer range of temperatures. The speed curves are shown in Fig. 19.

In this, as in the preceding series, the dead-hard tool gives a curve with a tall narrow peak, but with the maximum at the rather higher speed of 70 feet. At 100 deg. and 115 deg. the curve retains its position, but becomes lower. At 125 deg. the maximum moves to 80 feet, and the right-hand branch loses its concave form. At 130 deg. we have the remarkable appearance of a first peak sprouting, as it were, from the base of the second. At 140 deg. the first peak has outgrown the second, and at 150 deg. and higher temperatures only the first peak remains. It shrinks in size, but does not move to the right at high temperatures, as in the first series, except at 200 deg., where there is a slight movement to the right. The development of the two peaks is similar to that in the first series, but occurs at a rather lower tempering temperature.

In Fig. 20 are shown speed curves taken from a series of steels of varying percentages of carbon, which were kindly prepared and analyzed by Mr. Brearley for the purpose of these experiments. The tools were quenched in water at 780 deg. Cent., and were not tempered. The percentage composition of each steel is given beside the corresponding speed curve.

It is possible to trace a curious analogy between this series of curves and the second series taken from tempered tools, Fig. 19. Curves A, B and C are characteristic of the dead-hard high-carbon steel. In curve D the peak is thrown very much to the right, and otherwise resembles curve 125 deg., Fig. 19. In E we see the development of a first peak. In F this has increased in size, while the second has shrunk—compare curve 140 deg., Fig. 19. In G we have a single peak far to the right—see 200 deg., Fig. 19. In H the single peak moves again to the left—see 225 deg. to 275 deg., Fig. 19.

As these steels were not tempered, the whole of their carbon would be in the form of hardening carbon. One may, perhaps, hazard the conjecture that the corresponding curves in the tempered series indicate the same percentages of hardening carbon remaining unconverted by the tempering process. Whether this be so or not, it seems probable that comparisons between parallel series of curves produced from different classes of steel, or from steels of the same class differently treated, will eventually furnish a clue to the nature of the molecular changes which take place in steels subjected to varying cutting temperatures.

We have next to consider the results of some experiments which were made with a view to ascertaining how the durability of the high-speed steels is affected by the various methods of hardening commonly employed. The heat treatment of these steels was kindly undertaken by S. N. Brayshaw, who was largely responsible for the plan of the experiments.

The tools for the first series of these experiments were all cut from the same bar, ½ inch square, of a well-known brand of tungsten steel. The tools were all heated alike by being placed in the top chamber of Mr. Brayshaw's twin-chambered furnace at a temperature of 950 deg. Cent. They were left in this chamber for 2 minutes 30 seconds, at the end of which time they had attained a temperature of about 850 deg. Cent. They were then transferred to the bottom chamber at a temperature of about 1,275 deg. Cent, for 50 seconds exactly, and were subjected respectively to the following cooling processes:

Tool A was stirred vigorously in cold water —11 deg. Cent.

Tool B was stirred vigorously in boiling water.

Tool C was stirred vigorously in cold oil.

Tool D was plunged into fused salt at 668 deg. Cent.

Tool E was cooled in an air-jet.

Tool F was placed in wire netting and allowed to cool in still air.

The tools were then tested, and the resulting speed curves are shown in Fig. 21. These curves are placed as far as possible in the order of slowness of cooling, but the series is not in this respect a perfectly uniform one.

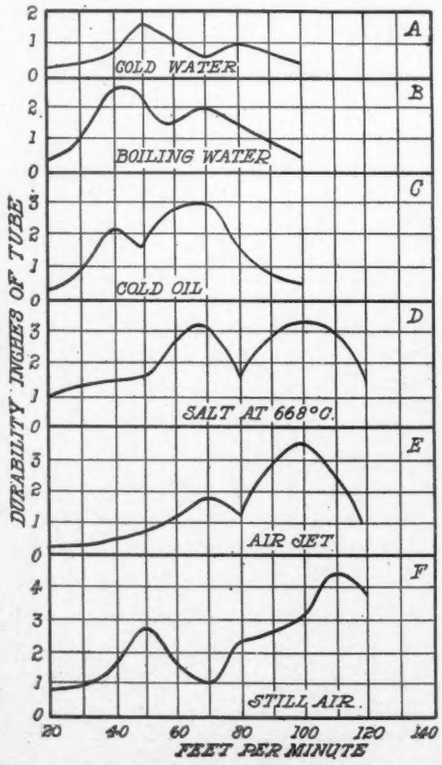
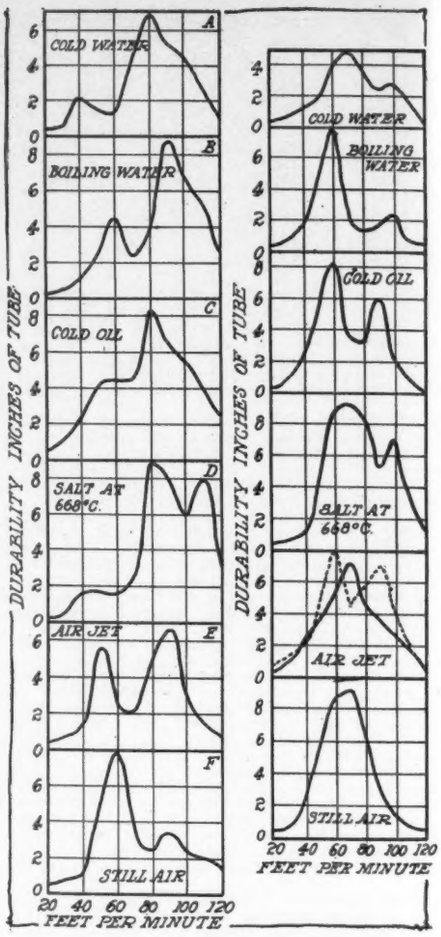


FIG. 22—TUNGSTEN-VANADIUM STEELS DIFFERENTLY HARDENED



FIGS. 21 AND 23—EFFECT OF HARDENING PROCESSES ON TUNGSTEN STEEL

Tool D was quenched in liquid salt at a high temperature; the cooling would therefore be extremely rapid down to this temperature, and this process is not strictly intermediate between the oil and the air jet. Again, it is not certain whether the oil or the air jet was the more rapid in action. Bearing these facts in mind, it will be seen that the curves, which are all of the double-peaked variety, display a fairly uniform and highly interesting series of changes.

Considering first curves A, B, E and F, which are certainly in the correct order of cooling, we see that A has a small first peak and a much larger second peak. In B the first peak has considerably increased in size. In E the first peak has further increased, while the second has decreased. In F the first peak has enormously increased, while the second has almost disappeared.

In curve C the first peak had almost coalesced with the second. It is difficult to determine the position of this curve in the order of cooling, since a tool quenched in oil is probably surrounded by an envelope of incandescent oil vapor for an appreciable time. A similar difficulty arises with regard to tool D. This curve has two features of special interest: the very low durability at all speeds below 70 feet and the high durability at a comparatively wide range of high speeds. It is instructive to compare the behavior of tools D and F at 60 feet and at 110 feet. In view of such a complete reversal, produced by a simple change in the manner of cooling, it is not difficult to account for the disappointing results which sometimes follow the substitution of a better or a more correctly hardened steel, when it is put to work under the same conditions which were found suitable for an inferior steel. Taking a general view of the results, one cannot fail to be impressed by the enormous influence exercised by the method of hardening on the cutting properties of the steel—an influence which is not merely quantitative in its effects, as hitherto supposed, but which may totally alter the characteristics of the steel. It would obviously be impossible to identify two samples of the same steel differently hardened. It is equally impossible to form an estimate of the quality of any steel by testing at any one speed, or even at a whole range of speeds, unless the hardening were known to have been such as to produce the best results. It also appears that the harden-

ing process which gives the best results for rapid or heavy cutting is the least suitable for light work.

These conclusions are confirmed by the next series of tests, made with tools cut from a bar ⅝ inch square, of a standard tungsten-vanadium steel. These tools were treated by Mr. Brayshaw in exactly the same manner as the preceding, except that they were allowed to remain in the top chamber of the furnace for only 1 minute 40 seconds, and in the bottom —high temperature—chamber for 40 seconds. The various cooling processes were exactly the same as before.

The tools, when tested, gave the curves in Fig. 22, above, which are arranged in the same order as those in Fig. 21. The most striking feature of these results is the very low durability of all the tools, as compared with that of the ordinary high-speed steel. This was not due to any defect in the quality of the steel, but to the fact that very little had been ground away in preparing the tools, so that the cutting edge came very near to the original surface of the bar. When this had been remedied by grinding well below the surface, the same tools gave the curves in Fig. 23. A comparison of the two series of curves is instructive. It would be possible to name at least one engineering works where it has been the practice to use expensive high-speed steels in tool-holders without forging, and without taking special care to remove the outer surface of the bar. The discontinuance of this practice dates from the production of the curves in Figs. 22 and 13.

A comparison of the curves in Fig. 23 with those in Fig. 21 reveals a remarkable difference in the order of the changes which take place. The quickest cooling—in cold water, in the case of the vanadium steel, produces a relatively large first peak, and a small second peak —exactly the reverse of what was found in the simple tungsten steel. With slower cooling both peaks increase in height, but retain much the same relation. The salt bath broadens the curve and throws the second peak to the right, and the slowest cooling produces only one peak.

The tool cooled in the air jet gave two distinct curves. The single-peaked curve was first obtained, but, as the tool was ground away in repeated sharpening, it was noticed that the durability at some speeds was altering. A complete curve was therefore made from the opposite side of the tool, and this curve, shown dotted, has two peaks.

The probable explanation of this is uneven cooling in the air jet, and a comparison with the curves above and below suggests that the double-peaked curve was given by the side of the tool on which the jet directly impinged. The cooling of the opposite side of the tool would be slower, the result being similar to that obtained by cooling in still air.

A somewhat similar phenomenon may be observed in the curves at the bottom of Figs. 22 and 23. These curves were obtained from the same tool, but the outer surface, which came into direct contact with the air, gave a double peak, Fig. 22. When this outer surface had been ground away, the single-peaked curve in Fig. 23 was obtained.

A great deal remains to be done in the way of determining the relation between hardening temperature and durability in high-speed steels. A number of experiments have been made with a view to taking a preliminary survey of this field of inquiry, but no definite conclusions can yet be put forward. The experiments were made with the tungsten-vanadium steel, which gave the curves in Figs. 22 and 23. Two methods of cooling were adopted—the bath of fused salt and still air. In Figs. 24 and 25 are given examples of the resulting curves. Those in Fig. 24 were obtained by heating to about 1,200 deg. Cent., and those in Fig. 25 by using a temperature of about 1,275 deg. Cent., the tools being soaked at this temperature for 3 minutes. The chief interest of these curves lies in the very definite development of the second peak by the use of the salt bath. In Fig. 24 the first peak remains practically unaltered in form and position, the maximum being at a speed of 60 feet per minute in each case, but the salt bath cooling produces a perfectly distinct peak at 100 feet. Hardening at the higher temperature, Fig. 25, the first peak occurs at the rather higher speed of 70 feet, and, as before, the salt bath develops the second peak; but in this case there is a great loss in durability at the lower speeds, and a marked extension of the curve to the right.

Taking a general review of the results put forward, it is clear that the three classes of steel experimented with are all capable of producing either a single or a double-peaked curve. The second, or high-speed, curve is strongly developed in high-speed and carbon steels which have been quickly cooled. The first, or low-speed, peak is developed in high-speed steel by slow cooling, and in the case of carbon steel by tempering at a high temperature. The effect of tempering high-speed steels has not been determined.

A moderate rate of cooling, or in carbon steels a moderate tempering, produces a double-peaked curve, the steel having great durability at both low and high speeds, but very little durability at some intermediate speeds. The curve of the tungsten-vanadium steel differs essentially from that of the tungsten steel similarly treated; but whether this is generally characteristic of the two classes of steel, or peculiar to the particular brands used in the experiments, has not yet been determined. Salt-bath hardening seems to be generally beneficial in the case of tools intended for high-temperature cutting.

No plausible hypothesis can yet be offered in explanation of the peculiar changes in the durability of steels—indeed, we have yet to determine what constitutes durability. It cannot be mere hardness, since there is no increase of hardness at increasing temperatures corresponding to the increasing durability shown by the rise of the left-hand portion of the speed curve. It seems more probable that this first increase of durability is due to a decrease of brittleness—a stronger coherence of the molecules as the temperature is raised. The decrease of durability shown by the descending portion of the curve may be due to an actual softening or tempering of the steel by the heat generated in cutting. The decrease of durability corresponding to the depression in the double-peaked curve can scarcely be due to a tempering process, since the steel could not in that case be expected to regain its durability at higher temperatures. This temporary loss of durability may, however, be due to an increase of brittleness occurring at certain temperatures.

If this can be established by means of breaking tests on hot specimens of steel which have been so treated as to give a double-peaked curve on the tool-steel testing machine, it should not be difficult to establish a partial temperature scale corresponding to the testing-machine scale of cutting speeds.

In the absence of any means of measuring actual cutting temperatures, the relation can only be established by making a complete speed curve in the lathe under ordinary working conditions, and comparing this with the curve made from the same tool on the testing machine. By preference, the tool chosen should be one which gives a double-peaked curve, since it would in that case be possible to correlate three distinct points on the curves, two maxima and a minimum. The author is not aware that a speed curve has ever been made on the lathe, and no doubt it would be a matter of some difficulty.

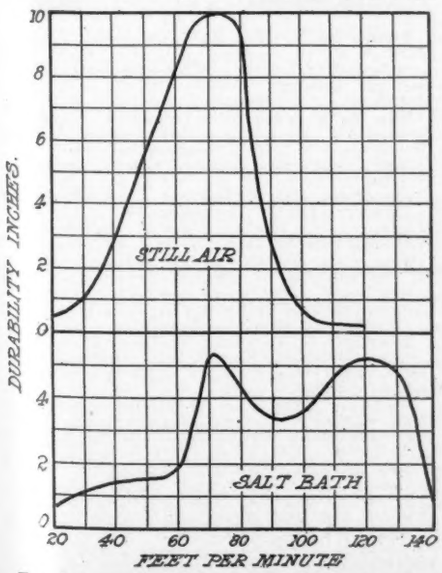


FIG. 24—TUNGSTEN-VANADIUM STEEL HARDENED AT LOW TEMPERATURES

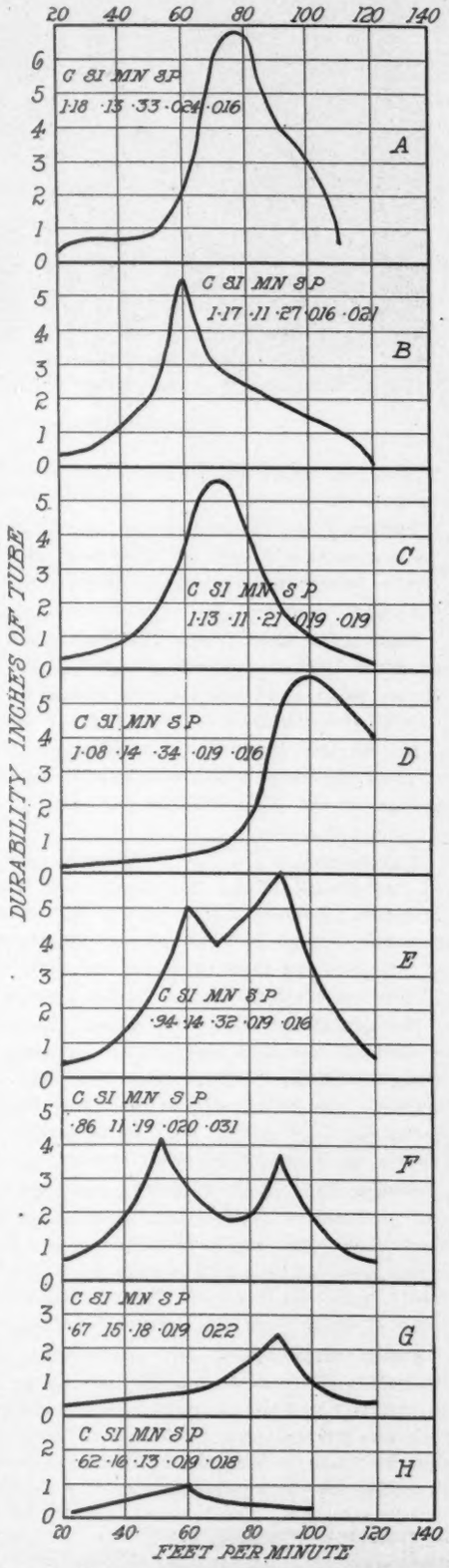


FIG. 20—PERCENTAGE OF CARBON AND DURABILITY, CARBON STEEL

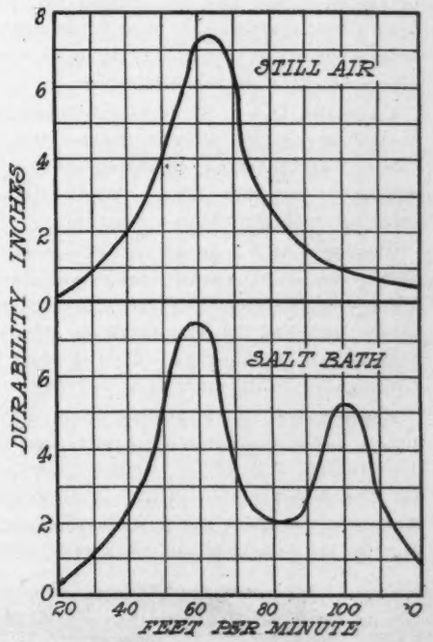


FIG. 25

Brief Business

NASHVILLE, TENN.—The Howard-Cregor Co. has opened its new garage at 1207-09 Broadway.

Fort Worth, Tex.—The Texas Motor Sales Co. is now located in its new home, corner of Sixth and Commerce streets.

Seattle Wash.—The Mantell Motor Car Co., local agent for the Everitt, is located in its new quarters at 303 East Pike street.

Tulare, Colo.—A garage of concrete will be built by Thomas H. Thompson at the corner of J and Inyo streets, to cost about $6,000.

St. Louis, Mo.—The Lindell Motor Car Co., of St. Louis, has moved its salesrooms into new quarters at 4829 Delmar boulevard.

New York—An Inter-State agency has been placed with the Croxton-Keeton Motor Co., 1662 Broadway, which has engaged Peter Fogarty.

Detroit, Mich.—The Craig Auto Co. will move into its new garage at 465 Woodward avenue about July 1 and will handle the Abbott-Detroit.

Chico, Cal.—The garage owned by J. Harley Smith on Main street has been sold to Ray D. Head and Howard C. Good. Both men live in Chico.

Boston, Mass.—The Knox Automobile Co., of Springfield, is erecting a new building, 125 by 66, six stories high, which will increase the floor space 25 per cent.

Pittsburg, Pa.—The Standard Automobile Co. has moved its offices from the old location in Baum street to its new plant at Grant boulevard and Bellefield avenue.

Muncie, Ind.—The Inter-State Automobile Co. is making preparations to enlarge its present plant. A new building of steel, glass and brick will adjoin the present factory.

Cincinnati, O.—The Cincinnati branch of the Goodyear Tire and Rubber Co., for some years located at 317 East Fifth street, will move, on or about July 1, to its new offices at 127 East Seventh street.

Cleveland, O.—A. W. Woodruff, formerly connected with the Western Reserve Motor Car Co., of Cleveland, as selling agent for Apperson cars, has joined the Cleveland sales force of the Stearns company.

Cleveland, O.—A garage is to be erected at the corner of Euclid avenue and East Twenty-fourth street on the property recently occupied by the residence of ex-Mayor Tom L. Johnson. It will have a frontage on Euclid avenue of 136 feet.

Augusta, Ga.—At a meeting of the Merchants and Manufacturers' Association, L. J. Williams and M. C. Dowling applied for the incorporation of the New South Automobile Co., for the purpose of engaging in the manufacture of motor cars, trucks and other vehicles to be propelled by gasoline power.

MAXWELL BRANCH'S NEW HOME IN INDIANAPOLIS

Pittsburg, Pa.—C. L. Sullivan has moved his top factory and paint shop from the Banker block to much larger quarters at 5917 Penn avenue.

Pleasanton, Kan.—Work has been started by A. Corby on a new garage, 120 by 50, one-story, brick and concrete structure, to cost about $4,000.

Los Angeles, Cal.—The Kisselkar agency is preparing to erect a new salesroom and garage at 118 West Pico street, with C. L. Leppo as manager.

Philadelphia, Pa.—The J. Ellwood Lee Co., of Conshohocken, Pa., is to erect a two-story concrete building, 400 by 82, four stories high, so as to have a capacity of 600 tires and 1,000 tubes per day, with 200,000 square feet of floor space.

St. Louis, Mo.—The University Automobile Co. has been installed in its new garage at 5800-2-4 Delmar boulevard. The building is new and affords room for the garaging of 100 cars. The company will handle the Henry in St. Louis territory.

Goshen, Ind.—Work has commenced on the erection of a one-story building on East Washington street which, when completed, will be used as a garage by J. E. Smith, agent for the Ford. The new building will be of brick and cement block.

Boston, Mass.—Work will soon begin at 915-921 Boylston street on the new home for the E. R. Thomas Motor Branch Co. The new structure will be 50 by 112. The first floor will be occupied as show rooms, executive offices, dressing rooms, etc. The other floors will be used for display rooms and service departments.

Greenwich, Conn.—The Mianus Motor Works Co. has increased its capital stock from $100,000 to $300,000.

Houston, Tex.—Clay B. King & Co. have moved from the Palace garage to the building occupied by the Auto and Motor Boat Co.

Toledo, O.—The new warehouse and repair shop of the Buick agency, 519-523 Erie street, is ready for occupancy and the removal will take place within a few days. A large elevator is being built in the

Recent Incorporations

Elmira, N. Y.—Elmira Taxicab Co., capital stock $1,500; to acquire, own and rent motor cars, motor cycles, etc.; incorporators, Howard H. Roberts, Gordon H. Roberts and Mortimer L. Sullivan.

New York—Metropolis Taxicab Co., capital stock $500; to manufacture, rent and deal in motor cars, etc.; incorporators, S. J. Quinn, John D. Ashtoon and George M. Brooks.

Woodland, Cal.—Woodland Auto Co., capital stock $12,000; incorporators, C. A. Osborne, C. S. Osborne, A. E. White and Catherine E. White.

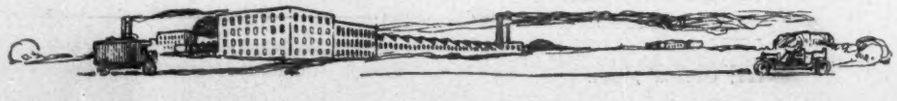
New York—Dunlop-Taylor Motor Co., capital stock $5,000; to manufacture and deal in motor cars and accessories; incorporators, Charles M. Dunlop, Marie L. Dunlop, Agnes E. Dunlop and Ben C. Taylor.

Brooklyn, N. Y.—Mack Brothers Motor Car Co., capital stock $25,000; incorporators, Willa C. Mack, Walter J. W. Groves and William F. Buchelt.

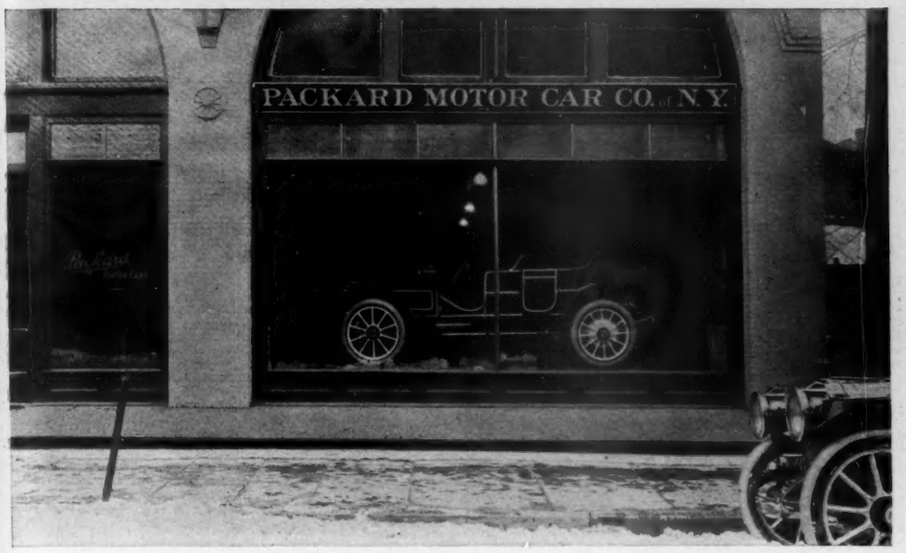
Rockville Centre, L. I.—Beck Co., capital stock $150,000; to manufacture, sell cars and motors; incorporators, W. H. Smith and J. I. Scott.

New York—Bretton Hill Garage Co., capital stock $50,000; to repair motor cars, and deal in accessories; incorporators, Max A. Cramer, Sigmund Meyer and Joseph Fischer.

New York—United States Wheel Co., capital stock $1,000,000; to manufacture and sell wheels for vehicles, motor cars, etc.; incorporators, Joseph Tooker, Samuel P. McConnell and Byron M. Fellows.



Announcements



HARTFORD BRANCH OF PACKARD MOTOR CAR CO. OF NEW YORK

warehouse, which will make the use of all three of the floors possible.

Olean, N. Y.—Joseph Hutchins has bought an interest in the garage business conducted by W. A. Grinard.

Buffalo, N. Y.—The Superior Motor Vehicle Co. has obtained a permit to build a brick factory at 1686 Elmwood avenue, at a cost of $81,000.

Akron, O.—The A1-Ton Motor Accessory Co. has been incorporated, with a capital stock of $50,000, to make and deal in motors and motor parts. The incorporators are Clyde S. Pelton, H. T. Maranville, Edward W. Brouse, C. H. Maranville and Harry Williams.

Columbus, O.—T. C. Hulbert, electrician and machinist, has established a garage on West Columbus street in Nelsonville.

Binghamton, N. Y.—The F. E. Spawn Co. has moved its showrooms and offices to 25 Henry street, in the Republican building.

Cleveland, O.—A recent addition to the row is a factory branch of the Stein Double-Cushion Tire Co., of Akron, located at 5901 Euclid avenue. P. H. Boalen is the manager.

Rochester, N. Y.—The James Cunningham Sons & Co. has decided to erect a large new plant on Litchfield street, a four-story, 135 by 127 feet, to be completed in about 4 months.

Tacoma, Wash.—W. B. Sanford, of the Tacoma Taxicab Co., has purchased the Washington Auto Machine Co., located at 705 Pacific avenue, and will continue the business at the same location.

Cleveland, O.—The Perfect Tire Co., of Cleveland, has been incorporated with a capital stock of $50,000 to make tires and motors, and to deal in parts. The incorporators are M. J. Kirby, William Eynon, Walter C. Eynon, W. A. Mayer, Frank L. Smith and Jacob Boepple.

Roswell, N. M.—C. M. Farnsworth bought of James W. Stockard a half interest in the Roswell Auto Co., which operates the mail and passenger stage between Roswell and Vaughn, and will erect a building 50 by 200 as additional garage room for the firm. The new building will be of cement floors, walls and roof and absolutely fireproof and will have an increase of 50 per cent in floor space.

Wilmington, Del.—The Overland Automobile Co. is building a new addition to its plant, of three stories, reinforced concrete, with a floor space of 50,000 square feet. It is expected to occupy this building in about 3 weeks.

Fort Worth, Tex.—The Fort Worth Taxicab Co. has established here, with headquarters at the Runnels Auto Co., Second and Throckmorton streets. The local company will be under the same management as the Dallas Taxicab Co.

St. Louis, Mo.—The Overland Motor Car Co. has just moved into its new quarters at 3907-9-11 Olive street. The incorporators of the St. Louis Overland are Jerome Harrington, T. B. Funk, Howard Harrington, W. M. Armour and C. S. Dines.

Detroit, Mich.—Two more branch agencies have been added to the already long list of the Regal Motor Car Co., the latest additions being at Denver and Indianapolis. The first is in charge of E. S. Norton and the latter is presided over by C. C. Rundell.

Louisville, Ky.—The Reimers Motor Car Co. is completing its new garage at Baxter and Broadway and expects to take possession in about 2 weeks. The building is constructed of brick, reinforced concrete and hollow tile. The company has taken the Babcock electric agency.

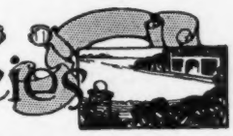
San Diego, Cal.—J. G. Burne closed a 5-year lease with L. W. Burnham, of the San Diego Motor Transfer Co., for the erection of a garage on the northeast corner of Thirteenth and D streets, 75 by 90, the building to be divided into a storage room, office and salesroom and shop.

Knoxville, Tenn.—A charter has been granted the East Tennessee Motor Car Co., of Knoxville. The company proposes to deal in cars and do a general repair business. The capital stock is $10,000 and the incorporators are A. P. Rutherford, D. H. Jenkins, W. H. Bowman, A. A. Scmid and E. P. Rutherford.

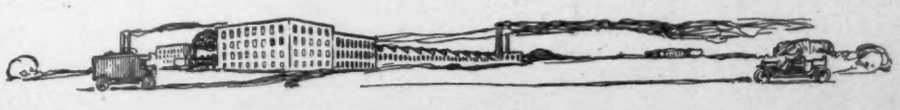
Spokane, Wash.—The Pacific Motor Car Co. announces the completion of its new quarters at First avenue and Maple street. The new building was especially constructed for the motor car business, the salesroom and office, 30 by 40, beamed ceiling, wainscoted walls, artistic electric fixtures and tile flooring.

Dover, Del.—E. T. Heite is to erect a large fireproof building, 35 by 160, at New and North streets, where gas and gasoline engines, equipments for motor boats, motor cars and stationary engines will be built. The new shops will have an inside measurement of 100 by 30 feet. The plant will be of brick, cement floors and iron roof.

New Agencies



Philadelphia, Pa.—Smith Brothers & Gibbons, Henry.
Cleveland, O.—Sterling Motor Sales Co., Jackson and Fuller.
Cleveland, O.—Commercial Auto Co., Chase and Gramm trucks.
Chicago—Velie Motor Car Co., Paige-Detroit.
Pittsburg, Pa.—Standard Automobile Co., Packard.
Toledo, Ohio—E. F. Leinhard, I. H. C.
Columbus, Ohio—Charles Schiaer Motor Car Co., Everitt.
Omaha, Neb.—Mid West Automobile Co., Westcott 40.
Omaha, Neb.—Velie Auto Co., Paige-Detroit.
Boston, Mass.—C. A. Eaton, Westcott.
Charlotte, N. C.—Sherrill & Littlefield, Elmore.
Detroit, Mich.—Collins & Co., Marmon.
Cleveland, Ohio—J. M. Rauch, Whiting 20.
Pittsburg, Pa.—East End Automobile Co., E-M-F and Flanders.
Warren, Pa.—Warren Garage Co., Buick.
Appleton, Wis.—W. D. Leggs, Rambler.
Philadelphia, Pa.—S. H. Marvel, Wisco.
Philadelphia, Pa.—George B. Clay and H. E. Browne, Cameron.
Philadelphia, Pa.—Harrington & Green, Firestone-Columbus.
Baltimore, Md.—American Motor Car Co., Reo.
Cleveland, Ohio—J. H. Greenwald, Ohio.
St. Louis, Mo.—Kardell Brothers, Van Dyke.



Manufacturers' Communications

A. L. A. M. HORSEPOWER

NEW YORK—Editor Motor Age—According to the provisions of the new motor law of New York state, which will go into effect August 1, motorists must pay annually a tax according to the horsepower of their cars, based on the horsepower formula adopted some years ago by the Association of Licensed Automobile Manufacturers, and known as the A. L. A. M. horsepower formula. There have been so many inquiries recently that it is thought well to explain how the user of a motor car driven by a gasoline engine can tell easily the official horsepower rating of his car under the New York law.

The A. L. A. M. publishes in the "Annual Hand Book of Gasoline Automobiles" a table from which can be seen at a glance the rating of a car according to the official formula. This table also is published in pamphlet form, showing the ratings of all motors from one to six cylinders, having a bore of from 2½ to 6 inches, or 64 to 152 millimeters. Anybody can, however, figure for himself the rating of his car, without referring to this table, because the formula is very simple, being as follows:

$\frac{D^2 \times N}{2.5}$ D square times N, divided by 2.5

two and one-half, wherein D represents the cylinder bore, N the number of cylinders, and 2.5 a constant based on the average view of the engineers as to a fair conservative rating for a four-cycle motor at 1,000 feet per minute piston speed. All there is to do, after knowing the cylinder bore, is to square the same, multiply by the number of cylinders and divide the result by two and one-half.

The A. L. A. M. formula, therefore, constitutes a simple, fair, uniform rating basis for motor car engines, within the limits of construction which have for some time come to be recognized in the motor car industry as commercially satisfactory. The primary purpose of the formula was to give light to the public as between motors rated high, as offering big value, and those rated modestly, as showing superior performance over nominally higher-powered cars. It is now adequately realized that the A. L. A. M. type of formula is of by far the most simple character that can be devised and that it is, moreover, almost inappreciably less accurate than any of the most complicated formulæ that have been advanced, so long as it is applied to the ordinary standard engines which are used for the propulsion of pleasure vehicles.

Piston speed is not an element of the A. L. A. M. formula itself. But the formula is based on 1,000 feet per minute piston speed; that is, in the case of two motors having the same number of cylinders and the same cylinder bore but different length of stroke, it is assumed that the motor with the shorter stroke will make a greater number of revolutions per minute relatively.

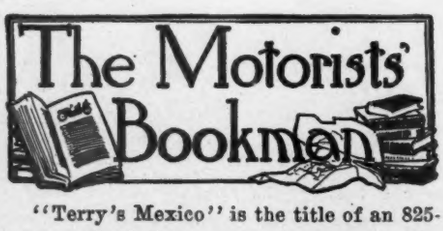
As per example, the application of the A. L. A. M. formula to a four-cylinder motor with a 5-inch bore would be as follows: Square of 5 inches equals 25; multiplied by 4, the number of cylinders, equals 100; divided by two and one-half, gives 40 horsepower.—Association of Licensed Automobile Manufacturers.

MAGNETO FOR LIGHTING

Cleveland, O.—Editor Motor Age—In a recent issue of Motor Age, in an article headed "Magnetos for Lighting," and signed "Subscriber," we notice that the author states that he has tried to use low-tension magnetos for combined ignition and electric lighting, and has not been successful, and he expresses the desire that "someone who has the inclination, ability and facilities will get busy and make a magneto that will successfully take care of ignition and lighting on a motor car at the same time. We wish to call the attention of this writer, through the columns of Motor Age, to the fact that we manufacture such a magneto, which will furnish two 3-ampere, 6-volt, 20-candlepower Tungsten headlights, a speedometer and a tail light.—K.W Ignition Co.

READY FOR THE MARKET

Chicago—Editor Motor Age—The writer's attention was called to Motor Age, issue April 28, Readers' Clearing House columns, wherein a reader asked about Bishop, Delano & Co. This company took over the business of Bishop, Delano & Co., the first of the year, and has been aiming to refine the system, bringing it up to a high standard. We have just completed this work and now are ready to market the product, but have decided to work in two fields—one with the manufacturers and another with individual owners in and near Chicago, where we can supervise the installation.—Kinley Mfg. Co., C. B. Kinley, president.



"Terry's Mexico" is the title of an 825-page, red, cloth-covered volume on our sister republic, compiled by T. Philip Terry, after years of travel, study and observation of the country, its people, and its customs, and is published by Houghton, Mifflin & Co., Boston. The text, which is a fund of information, tells of the history, natural features, arts and products of this Spanish-American country, and is supplemented by two maps and twenty-five plans. The introduction, covering 238 pages, deals thoroughly with such topics as expenses, money, passports, seasons, health, clothing, hotels, transportation, etc., discusses its history and arts, and closes with a chronological table of the important events in Mexican history. The balance of the book is devoted to a more specific study of the various sections of the country.

"Enamelling on Iron and Steel," by Julius Grunwald, and translated from the German by Herbert H. Hodgson, is a 128-page cloth-covered volume dealing with the theory and practice of enamelling on metals. The book treats of an interesting industry of which the public generally is ignorant. In the introduction the author calls attention to the wonderful growth and development of this industry in the past 15 years, and then discusses the various raw materials and their action which enter into the make-up of enamelling. Following chapters deal with the process of enamelling, including such factors as mixing, melting, grinding, heating and pickling, the applying processes and burning and firing. The author writes authoritatively on the subject, having had a very broad experience in enamel works, and is at present chemist and director of a large factory in the French center of the industry. This book is published in London by Charles Griffin & Co., Ltd., whose American representatives are J. B. Lippincott Co., New York.

Encyclopedic in its nature is the "Scientific American Hand Book of Travel," compiled by Albert A. Hopkins, and from the press of Munn & Co., New York. The prospective sea voyager will find this volume of 500 pages packed full of information pertaining to the ocean voyage and foreign touring. Part 1, devoted to the sea voyage, tells what such a trip or trips cost, discusses the wearing apparel for the sea, gives an account of life on shipboard, tells of the ship's construction, how it is navigated, and its equipment. A full cable code is given, as well as statistics as to size, speeds, records, tonnage, etc. Part 11, on foreign touring, covers the landing at the various ports, regulations, railway fares and connections, a list of 1,000 hotels graded as to cost, guides to London and Paris with maps together with a vast amount of other valuable information for the tourist. It is a cloth-covered volume, contains six color plates, 350 illustrations, maps, and plans, and is thoroughly up-to-date.